AUG 14 1944

ENGINEERING NEWS-RECORD

August 10, 1944

...as Road in Trinidad was ...ely from steep hillsides.

This Issue:

Unloading Heavy Material on Hostile Shores • Jungle Roadbuilding in Trinidad

Invasion Prelude—Bailey Bridge Training • Memphis Prepares for Its Next Flood

THE CHICAGO D. P. W. STOPS SOME MAINTENANCE PROBLEMS BEFORE THEY START

with BYERS WROUGHT IRON

The first thought of municipal engineers is to avoid interruptions to water service wherever possible. This aim is reflected in the careful specifications written for Chicago's new water filtration plant. The steam return lines (illustrated above), hot and cold water lines, downspouts and vents, and boiler feed piping are genuine wrought iron. And when restrictions are lifted, oil lines and oil burning equipment will be genuine wrought iron.

The soundness of this choice is confirmed by records of the piping in some of Chicago's old buildings. In a number of instances, wrought iron installed in plumbing and heating services is still on the job after 30, 40 and even 50 years.

Engineers in all sections have found wrought iron an excellent means of eliminating water works maintenance problems. Recent installations include such services as conductor and drainage lines; gas lines; pump piping; brine lines to a softening plant; carbon dioxide lines; chlorinators; and surface wash and underdrain piping for filter beds. In nearly every instance, some old installation in the locality provided the engineers with first-hand evidence of wrought iron's durability and dependability.

The ability of wrought iron to resist corrosion comes from its unusual structure. Fibers of silica slag, which make up about 3% of the material by weight, are threaded through the body of high-purity iron. The pitting that generally causes premature failure of ordinary materials is combated. The microscopic iron-glass threads halt corrosive attack, and force it to disperse over the surface of the material. In addition, they provide firm anchorage for the protective scale, which acts as a shield to the underlying metal.

You will find a very interesting discussion of some common piping problems, and reports of how they were successfully solved, in our technical bulletin, "Wrought Iron for Piping Systems." If you do not have a copy, we will gladly send you one.

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J-103

NGINEERING NEWS-RECORD

ted to Buildings, Sewers, Waterworks, Bridges, Roads, Dams, Foundations, Earthwork, Flood Control, Public Works, Shipbuilding, Irrigation, Canals, Railroads

McGRAW-HILL PUBLISHING COMPANY, INC.

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JOHN ABBINK, *Publisher*

WALDO G. BOWMAN, *Editor* ALBERT E. PAXTON, *Manager*

. 133 AUGUST 10, 1944 No. 6

OMING NEXT

ressure grouting with portland ent is being used to stabilize 100 s of main line track this year on Santa Fe Railway system near poria, Kans. Development of the ta Fe technique, methods and ipment employed, gang organiza-, construction costs and benefits pressure grouting are told by nk W. Capp, structural bureau, rtland Cement Association, Chi-o, Ill.

Labor camp housing and sanita-n are important measures to be sidered by contractors working in Tropics. What was accomplished a road construction job in Hon-as employing 1,700 native labor-is described in a report to *ENR* pared by the sanitation division of the Office of the Coordinator Inter-American Affairs.

One of the most important con-uction materials in the Pacific ater-of-operations has been steel ta. Millions of square feet of this terial has seen service for surfac-runways, and it has been in-niously applied to numerous other es. These are described by N. A. wers, *ENR* war correspondent in e Pacific.

How to use air-entraining cements described by H. G. Farmer and L. Lindsay, technical service di-ctor and director of tests and re-arch, respectively, of the Universal las Cement Co.

HINGS TO COME

Another example of North Amer-an engineering skills being applied aid our South American neighbors described in the story of "Chim-te: Potential Pittsburgh of Peru". sign and construction details are ven of an industrialization project olving port works, coal, iron and el development and the installation a hydro plant, housing and sanita-n facilities.

A group of articles scheduled for e Sept. 7 issue will outline new de-lopments in water supply and treat-ent practice. Special interest at-ches to the story of providing salt-ee water for Wilmington, N. C.

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Number of copies of this issue printed: 35,963

DO YOU WANT AN INDEX?

Due to the paper shortage, no index for the volume just completed, No. 132 (January-June, 1944) will be issued except to subscribers who ask for it. If you want a copy of the index please send in the coupon below. The index will be ready for distribution in the latter part of August.

Editor—Engineering News-Record
McGRAW-HILL PUBLISHING COMPANY
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BACK THE ATTACK...
BUY MORE WAR BONDS

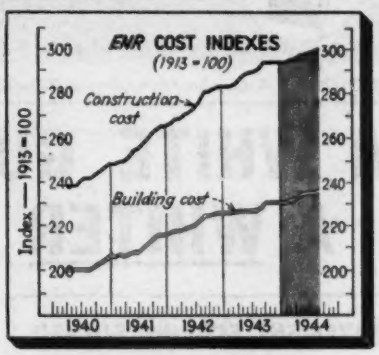
RYERSON

MONTHLY CONSTRUCTION BUSINESS SUMMARY

ENR CONSTRUCTION VOLUME AND NEW PRODUCTIVE CAPITAL

(,000 omitted)	July 1943 (5 wk.)	July 1944 (4 wk.)	% Change†	Seven Months 1943 (30 wk.)	Seven Months 1944 (30 wk.)	% Change
Total U. S. Construction	$296,288	$158,561	−33.0	$2,062,540	$1,050,391	−49.0
Private Construction	32,704	38,293	+46.0	255,188	239,774	−6.0
Public Construction	263,584	120,268	−43.0	1,807,352	810,617	−55.0
Federal	240,384	94,808	−81.0	1,683,791	675,721	−60.0
Total New Productive Capital	$2,424,122	$1,111,014	−43.0	$2,921,188	$1,554,291	−47.0
Private Investment	22,634	9,150	−50.0	107,217	151,031	+41.0
Federal (non-federal work)	148,000	83,330	−30.0	160,133	139,460	−13.0
Federal (federal work)	2,253,488	1,018,534	−43.0	2,653,838	1,263,800	−52.0
ENR Construction Volume Index, 1913 = 100	175	114	−35.0	205**	102**	−50.0

† *Adjusted for difference in number of weeks reported.* ** *Seven-month average.*



CONSTRUCTION COSTS . . . WAGE RATES . . . MATERIAL PRICES

	August 1943	August 1944	% Change	Changes July to August 1943 July	1943 Aug.	1943 %	1944 July	1944 Aug.	1944 %
ENR Construction Cost Index, 1913 = 100‡	291.38	300.42	+3.1	289.92	291.38	+0.5	299.94	300.42	+0.2
ENR Building Cost Index, 1913 = 100‡	228.49	236.00	+3.3	227.80	228.49	+0.3	235.55	236.00	+0.2

‡ *Does not reflect increased costs due to more overtime, lower labor efficiency, delivery delays, etc.*

ENR 20-CITIES' AVERAGE

Common Labor	$0.869	$0.882	+1.5	$0.863	$0.869	+0.7	$0.882	$0.882	0
Skilled Labor (Av. 8 trades)	1.622	1.639	+1.0	1.617	1.622	+0.3	1.638	1.639	+0.1
Bricklayers	1.715	1.739	+1.4	1.703	1.715	+0.7	1.736	1.739	+0.2
Structural Ironworkers	1.679	1.694	+0.9	1.679	1.679	0	1.694	1.694	0
Carpenters	1.472	1.484	+0.8	1.468	1.472	+0.3	1.484	1.484	0
Cement, per barrel	$2.61	$2.67	+2.3	$2.60	$2.61	+0.4	$2.66	$2.67	+0.4
Reinforcing steel, cwt.	2.75	2.79	+1.5	2.75	2.75	0	2.80	2.79	−0.4
Structural steel, base	2.10	2.10	0	2.10	2.10	0	2.10	2.10	0
Sand, per ton	1.21	1.23	+1.7	1.21	1.21	0	1.23*	1.23	0
Lumber, 2x4 Fir, per M ft.	51.13	54.58	+6.7	51.13	51.13	0	54.28	54.58	+0.6
Lumber, 2x4 Pine, per M ft.	45.28	53.68	+18.6	44.80	45.28	+1.1	53.09	53.68	+1.1
Brick, common, per M	15.68	16.52	+5.4	15.68	15.68	0	16.52	16.52	0
Ready-mixed concrete, c. y.	7.37	7.44	+1.0	7.37	7.37	0	7.43	7.44	+0.1
Struct. clay tile, 3x12x12-in.	78.74	80.48	+2.2	78.74	78.74	0	80.48	80.48	0
Paving asphalt, cars, ton	15.27	15.40	+0.9	15.22	15.27	+0.3	15.40	15.40	0

* *Revised.*

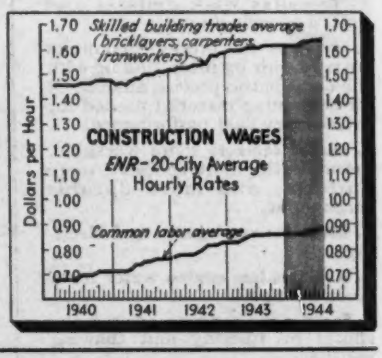
ENR INDEX NUMBERS

Base = 100	Construction Cost 1913	Construction Cost 1926	Building Cost 1913	Building Cost 1926	Volume '13	Volume '26
Aug., 1944	300.42	144.41	236.09	127.62	..	..
July, 1944	299.94	144.18	235.55	127.33	114	50
June, 1944	298.72	143.59	235.33	127.21	91	40
May, 1944	298.00	143.25	234.80	126.93	100	44
April, 1944	297.70	143.10	234.50	126.76	106	46
Mar., 1944	295.34	141.97	232.32	125.59	103	45
Feb., 1944	295.05	141.83	232.03	125.43	86	38
Jan., 1944	294.57	141.60	231.55	125.17	114	50
Dec., 1943	294.51	141.57	231.49	125.14	103	45
Nov., 1943	294.41	141.52	231.39	125.08	149	65
Oct., 1943	294.31	141.47	231.29	125.03	142	62
Sept., 1943	294.09	141.37	231.20	124.98	155	68
Aug., 1943	291.38	140.07	228.49	123.51	119	52
July, 1943	289.92	139.36	227.89	123.19	175	77
1943 (Av.)	289.95	139.38	228.75	123.66	176	77
1942 (Av.)	276.31	132.82	222.39	120.22	553	243
1941 (Av.)	257.84	123.95	211.46	114.32	375	164
1940 (Av.)	241.96	116.31	202.81	109.64	269	118

MATERIAL SHIPMENTS . . . . BUILDING PERMITS

	July 1943	July 1944	% Change	June 1944	% Change June-July
Steel (% operating capacity) A. I. S. I.	97.0	95.8	−1.2	96.9	−1.1

	June 1943	June 1944	% Change	Six Months 1943	Six Months 1944	% Change
Fabricated structural steel, tons, A. I. S. C.	68,352	33,046	−51.6	510,546	232,717	−54.4
Cement, thous. bbl., U. S. B. of M.	12,702	9,350	−26.4	64,938	41,834	−35.6
Building Permits, 215 cities, Dun & Bradstreet (,000 omitted)	$39,788	$58,179	+46.2	$230,730	$308,405	+33.7



COST OF LIVING INDEXES . . . . EMPLOYMENT

	June 1943	June 1944	% Change	May 1944	% Change May-June
Cost of Living Index (N. I. C. B.)	104.3	104.4	+0.1	104.4	0
Rent (Housing) Index (N. I. C. B.)	90.8	90.8	0	90.8	0
Total Employment (est.) thous., B. L. S.	39,859	38,627	−3.1	38,598	+0.1
Constr. Employment (est.) thous., B. L. S.	1,288	695	−46.1	688	+1.0

ENGINEERING CONSTRUCTION CONTRACTS—ENGINEERING NEWS-RECORD—JULY, 1944

Engineering News-Record *reports continental U. S. Construction projects of the following minimum costs—waterworks, excavation, drainage and irrigation,* $15,000; *other public works,* $25,000; *industrial buildings,* $40,000; *other buildings,* $150,000

Four Weeks—Thousands of Dollars (000 Omitted)

	New England	Middle Atlantic	South	Mid West	West of Mississippi	Far West	United States July 1944	United States Seven Months 1944	United States Seven Months 1943	Canada
Public Works										
Waterworks	72	305	968	216	737	1,206	3,504	17,479	33,955	165
Sewerage	64	536	624	635	468	996	3,323	16,952	24,592	.....
Bridges, public	.....	29	158	199	286	560	1,232	6,655	11,153	184
Earthwork and waterways	25	345	1,274	62	34	387	2,127	34,818	23,559	.....
Streets and roads	605	2,159	6,918	4,974	4,740	2,991	22,387	120,024	155,898	739
Buildings, public	1,802	12,821	5,653	4,779	3,625	10,026	38,706	372,330	966,254	7,523
Unclassified, public	1,430	3,649	6,709	3,937	8,702	24,562	48,989	242,359	501,941	500
Total public	**3,998**	**19,844**	**22,304**	**14,802**	**18,592**	**40,728**	**120,268**	**810,617**	**1,807,352**	**9,111**
Federal government (included in above classifications)	3,594	18,303	15,196	8,376	11,606	37,733	94,808	675,721	1,683,791	.....
Private										
Bridges, private	.....	.....	.....	.....	.....	.....	.....	1,325	2,220	.....
Industrial buildings	190	8,847	4,605	1,406	1,767	5,955	22,770	105,770	109,052	1,005
Commercial buildings	400	224	450	4,139	1,048	4,165	10,426	98,967	117,748	.....
Unclassified, private	117	25	1,075	95	3,656	129	5,097	33,712	26,168	3,729
Total private	**707**	**9,096**	**6,130**	**5,640**	**6,471**	**10,249**	**38,293**	**239,774**	**255,188**	**4,734**
Total Engineering Construction:										
July 1944 — 4 weeks	4,705	28,949	28,434	20,442	25,063	50,977	158,561	.....	.....	13,845
June, 1944 — 5 weeks	4,158	22,108	34,736	23,604	29,858	43,347	157,811	.....	.....	11,728
July, 1943 — 5 weeks	14,622	39,075	70,895	32,516	77,573	61,607	296,288	.....	.....	17,298
Seven Months — 1944	29,749	163,452	184,017	132,111	164,188	376,874	.....	1,050,391	.....	58,517
Seven Months — 1943	93,671	257,769	484,610	242,731	475,860	507,899	.....	.....	2,062,540	71,077

CONCRETE HIGHWAY NEWS

Universal Atlas Cement Company (United States Steel Corporation Subsidiary)
Chrysler Building, New York 17, N. Y.

OFFICES: New York, Chicago, Albany, Boston, Philadelphia, Pittsburgh, Minneapolis, Duluth, Cleveland, St. Louis, Kansas City, Des Moines, Birmingham, Waco

A WHITE GUIDE TO SAFETY BY DAY
A WHITER SAFEGUARD BY NIGHT

PAVEMENT SCALING SOLVED

with Atlas Duraplastic*
***air-entraining* portland cement**

Scores of highway, street and airport installations from New Hampshire to Minnesota made with Atlas Duraplastic are proving the scale resistance of this cement, originated, developed and perfected by Universal Atlas. Some of these installations have passed their fifth winter of service, and all are practically scale-free.

QUICK FACTS
about Atlas Duraplastic

1. **Complies** with Federal and ASTM specifications.
2. **Provides** the proper amount of entrained air by intergrinding with the cement the precise amount of air-entraining material needed for satisfactory field performance.
3. **Makes concrete** more workable, more plastic, more cohesive, more uniform, and more durable throughout.
4. **Minimizes segregation** and bleeding.
5. **Requires less mixing** water for a given slump.
6. **Fortifies the concrete** against the effects of freezing and thawing weather.
7. **Renders the concrete** highly resistant to scaling due to action of de-icing salts.
8. **Tends to reduce** manipulation scale.
9. **Produces concrete** that dumps, spreads, screeds and finishes more easily.
10. **Called Duraplastic** because it makes concrete more durable and more plastic.

Write for information on the use of Duraplastic and for reprints of articles from technical journals giving details of actual installations.

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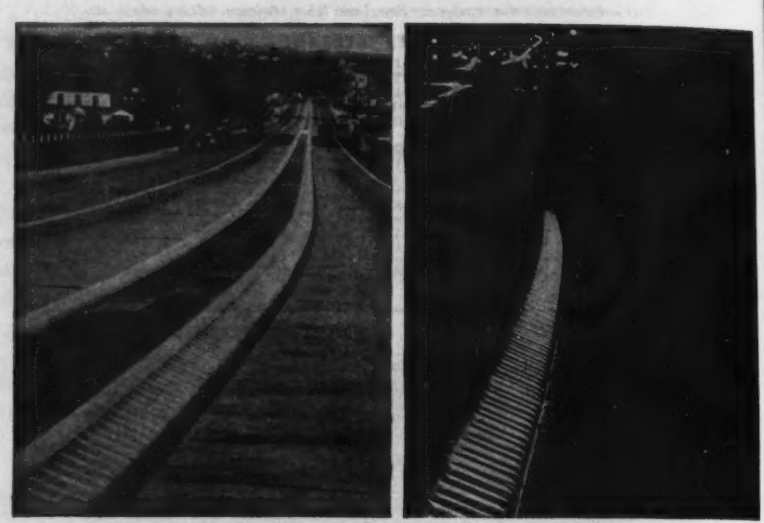
ENR-CD-4

White Concrete Reflecting Curb made with ATLAS WHITE CEMENT proves most effective when visibility is lowest



White Concrete Reflecting Curb, Route 4, New Jersey. **By day** it is clearly visible. **By night,** under car headlights only, the curb's white sawtooth faces shine out clearly, but its smooth white crown is lost in darkness.

SAFE DRIVING depends primarily upon visibility. Obviously, unless a driver can see, he cannot drive at all. The only object he can see is one which itself is lighted, or one which reflects light.

For night driving, the main source of light is the driver's headlamps, and his guide to safety is the road's edge. Curb defines the road's edge but does so effectively only when it is highly visible. It is visible at night only when it *reflects light* and then only when it reflects that light *in the right direction;* namely back to the driver. The diagrams below show why.

For information on design and installation, write for a copy of the book, "A White Guide to Safety."

A smooth curb (left) wastes light . . . reflects it up and away from the driver. A White Concrete Reflecting Curb (right) conserves light . . . reflects it back to the driver. A smooth curb is barely visible at night; a White Concrete Reflecting Curb stands out—bright and clear.

UNIVERSAL ATLAS CEMENTS

UNIVERSAL PORTLAND • ATLAS PORTLAND • ATLAS WHITE • ATLAS DURAPLASTIC • ATLAS HIGH-EARLY

The Week In Engineering and Construction

ENGINEERING NEWS-RECORD • AUGUST 10, 1944 • VOLUME 133 • NUMBER 6

Resumption of construction discussed with Nelson

WPB chairman understood to have assured representatives of the construction industry that restrictions will be relaxed as war conditions permit

Representatives of the construction industry, brought together by the U. S. Chamber of Commerce on Aug. 3, met with Donald M. Nelson, chairman of the War Production Board, to discuss means for speeding up the resumption of construction as soon as war conditions permit. Mr. Nelson is understood to have assured the construction industry group that steps will be taken to relax WPB restrictions on construction as rapidly as can be done without harm to the war effort.

Organizations represented

Persons conferring with Mr. Nelson and the organizations they represent were:

U. S. Chamber of Commerce: F. Stuart Fitzpatrick, manager, Construction and Civic Development Department.

American Society of Civil Engineers: Allen J. Saville and E. Lawrence Chandler, assistant to the secretary.

American Institute of Architects: D. K. Este Fisher, Jr.

Associated General Contractors of America: William Muirhead, president, and H. E. Foreman, managing director.

National Association of Home Builders: Robert P. Gerholz, president, and Frank W. Cortright, vice-president.

The Producers' Council: Douglas Whitlock, president, and J. W. Follin, managing director.

National Lumber Manufacturers Association: R. G. Kimbell.

National Association of Retail Lumber Dealers: Norman P. Mason, vice-president.

Mr. Saville is chairman of the construction industry committee named by the U. S. Chamber of Commerce to outline the topics presented to Mr. Nelson.

Proposals put forward

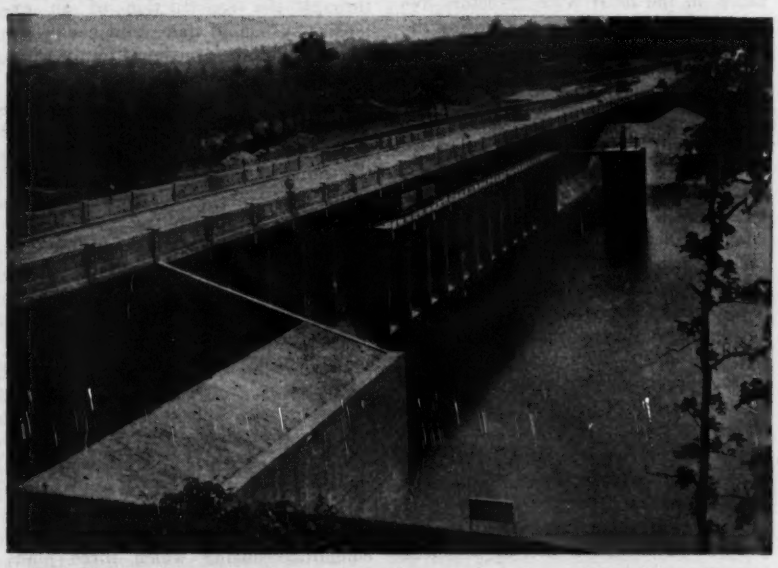
In its statement to Mr. Nelson the committee said:

"The construction industry recognizes the fact that as the normally second largest employer of labor in the country and perhaps the most easily expansible group we will be called on to take on a tremendous task of re-employment in the immediate transition period. We are very anxious to be prepared in a practical way to take up this unemployment when, as and where it occurs. Obviously it will not occur simultaneously all over the country. This is the problem that we would like to discuss with you.

"We recognize the necessity for the continuance of the control of materials as long as war production demands require, but we definitely are of the opinion that this control should cease at the earliest possible moment. As an interim measure of control, we have suggested the following basis:

1. In any local area civilian work shall be approved for construction in

(*Continued on next page*)



Brighton Reservoir water for suburban Washington

The Washington Suburban Sanitary Commission began delivering water from its new $2,500,000 water supply development on the Patuxent River above Laurel, Md., the first week in July. Despite the fact that steel scarcity has prevented installation of 13 taintor gates the reservoir, up to the spillway crest level, is being used to relieve water shortages in Prince Georges County.

The reservoir, when full, will be more than 5 mi. long and will have a safe dry season yield of 25 mgd. It will cover 775 acres and have a gross capacity of 6.5 billion gal. The dam is a deck and buttress type concrete structure 600 ft. long with flanking earth fill making it 995 ft. overall. It is more than 80 ft. high from solid foundation rock to the level of the roadway crossing the top of dam.

Function of the dam is to store water until such time as the flow of the Patuxent River is insufficient to provide the necessary water for the requirements of the suburban district surrounding the District of Columbia area on the north and east. When needed, water from storage is released into the river channel to be picked up a few miles downstream and pumped to a filtration plant.

The dam was designed by Ambursen Engineering Corp. and its construction directed by them using forces of the Sanitary District. Harry R. Hall is chief engineer of the Washington Suburban Sanitary District and has supervised the project. An article describing the work will appear in a later issue.

order to keep the manpower in this local area as far as practicable busy in their own line of endeavor.

2. The War Production Board shall issue from time to time a list forecasting critical materials or the hard-to-secure materials usable for non-war construction, and these lists shall immediately be available to the public, so that plans for new construction proposed can take the list into consideration.

3. In the selection of specific jobs in the local area by the War Production Board for approval, consideration shall be given to three factors:

(a) The availability of manpower on a regular basis in the area.

(b) Consideration of the required use of critical materials.

(c) The value to industry or benefit to the community of the construction proposed is to be determined when available labor and material are not sufficient to meet current demands.

4. To carry out this program authority should be vested, as far as practicable, in the local WPB directors. No project should be approved unless the work will go forward within 30 days after the approval. To assist these local directors, competent boards should be set up in each community composed of representatives of the construction industry and of the users of construction service, both private and public.

"It may be that this problem of local unemployment may become acute much earlier than we had anticipated. Under these circumstances, it occurs to us, as a practical solution, that the agencies of the government involved in this change-over should pay more attention to the problems confronting the construction industry in its attempt to perform its necessary functions. We would like to suggest to you that, in view of this situation, the problem of the construction industry and its part in the relief of unemployment in the postwar reconversion are of sufficient importance to have a vice chairman in complete charge of arrangements for this reconversion and postwar construction program."

• • •

St. Louis bond issue for postwar public works

On August 2 the citizens of St. Louis, Mo., voted overwhelmingly in favor of the city's $43,527,000 municipal bond issue, planned to provide postwar improvements made possible by this financing when it becomes effective. Included are hospitals and other institutions, parks and recreation, waterworks, sewers, bridges, viaducts, streets, airports, and an art museum.

Large reclamation and power project under study for Central Arizona

State of Arizona and U. S. Bureau of Reclamation begin study of three major undertakings, the largest to cost $487,000,000

Selection by Arizona of a state project engineer to work with U. S. Bureau of Reclamation engineers in surveying a route for bringing waters of the Colorado River into central Arizona under three proposed large reclamation and power development projects was announced in Phoenix, Aug. 1, during a hearing conducted by a U. S. Senate subcommittee on irrigation and reclamation.

To use Colorado River water

Long-considered plans to create a vast reclamation and power development empire in central Arizona by the diversion of Colorado River waters through the construction of an extensive system of dams and canals assumed tangible form late in July when Sidney P. Osborn, governor of Arizona, and H. A. Bashore, commissioner of the U. S. Bureau of Reclamation, signed a contract making the state and the bureau full partners in the projected survey.

Purpose of the contract was to fix cost responsibilities of the preliminary work. Under the terms of the instrument the costs will be borne on a partnership basis by Arizona and the bureau, with the state being represented on all reclamation studies by an engineer of its selection. R. Gail Baker, former assistant chief engineer and superintendent of Salt River Valley Water Users Association, was chosen for the position.

Signing of the contract was followed by a two-day session of the Senate subcommittee during which three plans for diverting more than 2,000,000-acre-ft. of Colorado River flow were discussed.

Three projects under study

The projects as described by E. B. Debler of Denver, director of project planning for the Reclamation Bureau, with comparative costs were:

1. A high dam in Marble Gorge 36½ mi. below Lee's Ferry, and above Grand Canyon National Park; a 139-mi. tunnel to a point on the Verde River near Camp Verde, and a series of dams along the Verde for stream regulation and power development. Cost of the project, exclusive of the cost of Marble Gorge dam, which the Reclamation Bureau plans to build as a power development under any circumstances, was fixed at about $487,000,000.

2. A high dam at Bridge Canyon at the head of Lake Mead (*ENR* Jan. 20, 1944, p. 72), a 72-mi. tunnel to Sacramento Wash, an 82-mi. tunnel from Sacramento Wash. to the 400,000-acre-ft. reservoir site on Cunningham Wash near Parker, and an 180-mi. canal from that point to Granite Reef dam. Cost of this project was estimated at $325,000,000, exclusive of that of Bridge Canyon dam, which is also planned as a power development.

3. Pumping plant on Lake Havasu to lift the water 1,040 ft. into a canal that would carry it to the Cunningham reservoir site, then an 180-mi. canal to Granite Reef. This project would cost about $134,000,000.

Discussing the merits of the three proposed projects, Mr. Debler said that the power generated by the Marble Gorge development would bring in revenue of about $28,450,000 a year; that of the Bridge Canyon project about $23,875,000 annually, and that of the Lake Havasu project about $22,235,000. The amount of power that could be generated by any one of the three projects finally chosen was estimated as high as 12,000,000,000 kw.-h. per year, and the number of new farms that would be created by the new water supply that would be made available was fixed at anywhere between 10,000 and 20,000.

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New dam and reservoir planned near Sacramento

Plans for a $50,000,000 multiple purpose postwar dam to be located on the American River above Sacramento, Calif., to utilize some of the state's water resources have been announced by the Bureau of Reclamation.

The proposed dam would be 8,600 ft. long and 440 ft. high and would be flanked by two saddle dams, one 7,400 ft. long and the other 1,000 ft. long.

Expected benefits from the dam and reservoir, two miles from the town of Folson, are flood protection, hydro-electric power, recreational opportunities, and a supply of 800,000 acre-ft. of irrigation water annually.

Reforms in water resources policy urged by U.S. Chamber of Commerce

Conflicting interests of Reclamation Bureau and Corps of Engineers are scored in a 10-point platform recently adopted

ven declarations of water resources cy, based on a report by the Natural ources Department Committee of the S. Chamber of Commerce, were re- ly adopted in referendum by the mber's membership.

Broadly speaking, the policies con- n the conflicting interests of the reau of Reclamation and the Corps Engineers; the conflict between es over water-use; federal domina- n over states' rights and the rights private industry; and Congressional trol. More specifically, the declara- ns:

1. Advocate legislative policies to ure that private enterprise can de- op water resources, and can also sell wer developed by the government. irect power development by fed- l agencies is the outgrowth of ece-meal impregnation of existing tutes with grants of authority to ild power plants and generate wer," says the report, which adds at "the power of any project that w includes reclamation among its rposes can be developed by the eclamation) Bureau."

The report says further: "Should the wer provisions of the pending Rivers d Harbors Bill (H. R. 3961) which ere defeated in the House be rein- ated by the Senate and become law, e Corps of Engineers would then be le to develop the power resources at l government dams."

2. Urges the sale of government oducts at prices sufficient to include th costs and the same amount in xes that would be paid by competing ivate enterprise, even though munic- alities, cooperatives or other pub- ly-owned agencies are given first oice to purchase.

3. States that Congress regain control er development of water resources, d authority over public works. Con- ess set the stage in 1933 for loss of is control, says the report, "by author- ing the President to establish such gencies 'as he may find necessary' and 'delegate any of his functions and owers' growing out of Title II of the ational Industrial Recovery Act." This uthorization, the report continues, in- uded control over water purification d water power as well as construction f river and harbor improvements and ood control.

4. Requests that construction projects now under consideration be re-estimated in the light of increased costs to assure that costs are correct, that projects will accomplish their declared purpose, and that the intended benefits are necessary.

5. Advocates that all projects, particularly flood control, be carefully considered in relation to others, in order to avoid undertakings which may prove disastrous instead of beneficial. In this connection, the report charges that lack of coordination has resulted in "waste, conflicts and programs for special purposes that are harmful to other worthwhile objectives," and that "projects have been authorized under grossly inadequate cost estimates, without any clear idea of the objectives of the expenditures, their value, and whether or not they were worth the money expended."

6. Urges that regional power pools be established, for sale under contract, of all hydro-power, whether developed by public or private agencies, with government by-product power sold as such at point of production.

7. Urges that the purpose of all projects, particularly of multi-purpose projects, be clarified and declared in advance, and not be changed without consent of the Congress.

8. Declares that, in the consideration of navigation works, Congress recognize states' rights in water use; that it protect established and potential uses for all purposes; that apportionment of waters be made by the Supreme Court in cases where agreement between states cannot be arrived at by compact; and that Congress not use any authority to limit water uses established by states.

Declaring that reservoir construction as a part of navigation improvement and flood control projected the federal government into water courses "far above the reaches formerly recognized as 'navigable in fact'," the report says that navigation demands for water thus came into direct conflict with uses of water authorized by the states.

9. Careful consideration is urged regarding regional authority plans in order to prevent scrapping of state lines and the centralization of control. The report says the regional authority idea is entirely foreign to the principle of states' rights. As an example it refers to the Tennessee Valley Authority which, it says, "Instituted a super government, superior to the state and local authorities." TVA not only usurped all state regulation, the report continues, but also crowded out other federal agencies.

10. Finally, it was urged that water resources be developed on sound engineering policies and not on a political or partisan basis.

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Tires for construction get new priority rating

Trucks handling materials used in construction and those used in construction work are included in a list of essential services to be given preference for obtaining tires, according to new rationing rules.

The War Production Board and the War Food Administration proposed the list at the request of the Office of Defense Transportation after WPB, because of a shortage, had allotted only 57,000 tires per month for essential truck and bus use in sizes 8.25 x 20 and larger, despite ODT's request for 165,000. Though WPB later increased the allotment to 73,000, this is still less than half the monthly requirements estimated by ODT for the third quarter.

Tires used in the production of lumber, building materials and clay products, architectural and ornamental structural metal, and structural glass and stone, are all given one of the three lowest ratings, as are quarry products. Highway maintenance and repair services may receive a top rating if such service is for access roads to war industries or military establishments. Otherwise, they are rated fourth. Trucks used in the repair of buildings and equipment,the production and distribution of timber are given second place.

To assist in putting the priority ratings in effect, the Office of Price Administration has cancelled all outstanding tire ration certificates dated July 15 or earlier for tires in the 8.25 size and larger.

In order to ease the situation, Charles E. Wilson, executive vice-chairman of WPB, has called on the tire industry to increase its output of heavy tires 30 percent during August and September. To help make this possible, Maj. Gen. Lucius D. Clay, director of Materiel, Army Service Forces, has announced that the Army will furlough back to the manufacturers for heavy tire building all soldiers over 30 years old who are not in the infantry, who have had one year's experience as heavy tire builders and banbury room workers in the tire industry, and who are in this country.

Chester bridge designed for 30-lb. wind load

The Mississippi River bridge at Chester, Ill., that lost its two main spans in a violent wind storm on July 29 (*ENR*, Aug. 3, p. 125) was designed for a wind pressure of 30 lb. per sq. ft., according to John I. Parcel of Sverdrup & Parcel, the designing engineers.

In providing for wind on the unloaded structure (that is, dead load plus maximum wind effect), a pressure of 30 lb. per sq. ft. was assumed on the vertical projection of two trusses, two handrails and the floor. This was treated as a moving load. Members governed by this loading were proportioned for *normal* unit stresses. This, according to Mr. Parcel, is equivalent to 40 lb. per sq. ft. when applied to 1½ the "silhouette area" of the structure, as is standard practice for short spans.

Using the widely known formula

$$p = 0.0032\ V^2$$

the specifications will provide for a wind velocity of 97 mph. at normal stresses, with a large margin of safety.

In the matter of overturning, Mr. Parcel states that their computations indicate that a pressure of 83 lb. per sq. ft. over the entire length would have been required, if applied as indicated in the specifications. If only 1½ of the area seen in elevation is taken as effective, 110 lb. per sq. ft. would have been required. Using the above elevation, 83 lb. per sq. ft. corresponds to a wind velocity of 161 mph., and 110 lb. to 185 mph.

Eye-witness accounts

The storm that wrecked the bridge originated in St. Louis and Jefferson counties, where it uprooted trees and did minor damage to roofs, and gained in intensity as it moved down the river toward the bridge. Several people were on the bluff overlooking the river at Chester. Two, who have been through tornadoes before, state that they observed the typical funnel-shaped cloud characteristic of a tornado.

No damage typical of a tornado was done in Chester itself, but three towboats moored down at the river in front of Chester were sunk and a 45 ft. pusher boat was torn from its mooring.

A truck loaded with furniture crossed the bridge from the Missouri to the Illinois side just before it collapsed, and the driver of the truck told the toll collector that the wind was so high that he lost half of his load.

Spans lifted from piers

Three independent witnesses have been found who claim to have seen the bridge collapse. All agree that apparently the Missouri end of the continuous span was lifted clear off its supports, after which it fell to the river, taking the Illinois span with it. Nothing inconsistent with this behavior has been found in the condition of the pier tops, except that the teeth of the expansion joint at the Missouri end are uninjured, which would indicate that there must have been a longitudinal movement of the span at the time it was lifted. This would have been necessary to disengage the teeth without injury.

The main channel span was a 1,340-ft. through truss, continuous over two 670-ft. openings. On both sides of the main span were two 250-ft. openings spanned by continuous deck trusses, which were left absolutely intact.

The main trusses were spaced 28 ft. 6 in. on centers, height 60 ft. at hip, 100 ft. at center, and 70 ft. for the greater part of each span length. The total weight, including floor and bracing, was about 6,205,000 lb., or 4,640 lb. per lin. ft. The floor was a 4½ in. filled grating welded to the stringers.

In considering the question of uplift, Mr. Parcel states that the average weight of the bridge was 155 lb. per sq. ft. of floor area; in the outer half of the spans this was somewhat less, approximately 154 lb.

Bridge insured

Officials of the Chester Bridge Commission are reported to have estimated the damage to the bridge at $675,000, which is "fully covered by insurance." Unofficial estimates put the insurance coverage at $400,000.

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New York zone hearings bring out building plans

The prospect of early changes in New York City's zoning law have caused the filing this month of a number of plans for important new buildings including several skyscrapers. The filings were the heaviest in the city in more than a decade, and with other projects submitted to the Department of Housing and Buildings bring to $32,000,000 the volume of new buildings for which preliminary sketches have been filed recently.

The structures for which plans were filed are all office buildings and will rise in the midtown and downtown sections of Manhattan.

The costliest of the proposed structures will occupy the old Hippodrome site on the east side of Sixth Avenue from 43rd to 44th streets, which is now operated as an auto parking lot. It will be forty-two stories high and will cost $9,375,000.

Other proposed buildings include: A 35-story building at 640-50 Madison Ave.; a 50-story building at 14 to 22 Cortlandt St.; a 33-story building at 38 to 56 Beaver St.; a 42-story building at Sixth Ave. and 39th St.; a 37-story building at Broadway and 38th St.; and a 16-story building at 15-21 West 51st St.

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Underground parking proposed for Pittsburgh

An underground parking garage at the entrance to Pittsburgh's Schenley Park has been suggested by Safety Director George E. A. Fairley, who says that it is "the only solution to the Oakland-Schenley Farms problem, where at times streets are parked solid on both sides."

MEETINGS

Regional and Local

NORTH CAROLINA LEAGUE OF MUNICIPALITIES, annual meeting, Robert E. Lee Hotel, Winston-Salem, N. C., Aug. 23-25.

PENNSYLVANIA WATER WORKS OPERATORS ASSOCIATION, eastern Pennsylvania section, Columbia, Pa., August 28-29.

NORTHERN MICHIGAN COUNTY ROAD COMMISSIONERS' ASSOCIATION, annual meeting, Cadillac, Mich., Sept. 7-8.

NORTH DAKOTA WATER AND SEWAGE WORKS CONFERENCE, 16th annual convention, City Auditorium and World War Memorial Building, Bismark, N. D., Sept. 12-13, jointly with the North Dakota League of Municipalities.

NEW ENGLAND SEWAGE WORKS ASSOCIATION, fall meeting, Hotel Bancroft, Worcester, Mass., Sept. 13.

AMERICAN WATER WORKS ASSOCIATION, WESTERN PENNSYLVANIA SECTION, AND WESTERN PENNSYLVANIA WATER WORKS OPERATORS ASSOCIATION, joint wartime conference, Roosevelt Hotel, Pittsburgh, Pa., Sept. 13-14.

SOUTH DAKOTA WATER AND SEWAGE WORKS CONFERENCE, annual meeting, Lincoln Hotel, Watertown, S. D., Sept. 19-20.

NEW ENGLAND WATER WORKS ASSOCIATION, annual meeting, Poland Spring House, Poland Spring, Maine, Sept. 19-22.

CANADIAN GOOD ROADS ASSOCIATION, Cornwallis Inn, Kentville, N. S., Sept. 26-27.

The fall meeting of the New York Section, American Water Works Association, has been cancelled.

Construction labor camps proposed for projects in ten western states

U. S. Grazing Service recommends building camps for its construction operations and for other future federal projects

As a solution to the problem of attracting labor to work on postwar construction jobs projected in remote and isolated areas, the Bureau of Grazing has recommended to Secretary of the Interior Harold L. Ickes the establishment of labor supply centers and work camps.

According to the proposal, mobile camps costing $4,810,000 could be utilized in the ten western grazing states to furnish labor not only for the $200,-121,400 worth of work for the bureau's own grazing projects, but also for similar works in a probable amount of over $250,000,000 for projects on grazing lands other than federal, and upwards of $1,000,000,000 for government public-works projects proposed for "after-victory" construction in the states where grazing is common. The Grazing Service hopes to secure funds for final planning of its camp and construction program, a preliminary report of which has been sent to the Bureau of the Budget.

Projects included

Projects in the $250,000,000 of work for the U. S. Grazing Service include stock-water reservoirs, wells and storage facilities, developing springs and building pipe lines, truck trails and cattle guards, stock trails and driveways, fences, bridges of more than 20-ft. span, telephone lines, check dams, diversion dams and ditches, revegetation activities and rodent control.

The Interior Department has not yet acted on the proposal, which was made in a memorandum to the secretary and signed by J. H. Leach, as acting director of grazing. Clarence L. Forsling has since been named director.

In its memorandum to the Secretary of the Interior, the Grazing Service states that "Upon the establishment of such centers there would be available a supply of labor for state projects, federal-aid highways, and agencies of the Interior, Agriculture and other departments of the government.

Type of camp

Camps with portable buildings to accommodate 100 men each, the service estimates, could be built at a cost of $20,000 per camp. Assuming that needed construction in a given locality could be completed in a two-year period, each camp would be moved every two years during a six-year "after-victory program", at a cost of $5,000 a move.

The camps would be built in the following states at the cost indicated: California $90,000, Utah $780,-000, Nevada $870,000, Oregon $330,000, Idaho $52,000, Montana $300,000, New Mexico $660,000, Colorado $480,000, Arizona $330,000, and Wyoming $450,-000. These cost estimates are based on the cost of CCC camps.

In addition to the Grazing Service construction and camp costs, that of needed equipment and tools for construction of the service projects is estimated at $21,787,100, bringing the total for its proposed six-year program to $226,718,600. Man-days of engineering and supervision for the work planned ,are estimated at 2,813,180 and labor 21,459,860 man-days.

These figures were arrived at on the basis of 260 work days per year. In estimating costs, skilled and unskilled labor costs were computed at $5 per day, and project engineering and supervision at $7 per day.

The construction plans of the Grazing Service were previously known as the six-year improvement program, a program which had been submitted to the National Resources Planning Board. With the onset of war, the plan was renamed the After-Victory Program.

Navy to spend millions at Alameda air center

For construction and improvements at naval air facilities comprising the Naval Air Center, Alameda, Calif., the Navy Department will spend a total of $22,000,000, it was announced recently.

Nearly half of the allocation will be spent on expanding installations at the Alameda Air Station, and the remainder will be distributed among 10 auxiliary stations and five air facilities in northern and central California and Nevada.

Included in the building program are runway extensions, hangars, radio transmitter houses, gasoline storage facilities, classrooms and ready room construction. Most of the $22,000,000 will be spent on enlarging living accommodations.

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Triboro Bridge traffic rose in past 6 months

Motor vehicle traffic over facilities controlled by the Triborough Bridge Authority, New York City, for the first six months of this year was 48.8 percent heavier than for the corresponding period of 1943, while revenues from tolls and parking fees, which reached $1,755,382, increased by 44 percent over 1943, it was disclosed in the semi-annual report of the authority, issued recently.

Triborough structures handled a total paid traffic from Jan. 1 to June 30 of 9,218,216 vehicles, compared with 6,-195,839 for the corresponding period of 1943, an increase of 48.8 percent, the report, issued by George E. Spargo, general manager and secretary of the authority, stated.

Scientists and engineers needed

The Office of Scientific Personnel of the National Research Council has been receiving a large number of requests for scientific and technical personnel. These requests are from industrial and governmental laboratories interested in research personnel, as well as from colleges interested in teachers and from industrial establishments interested in a wide variety of scientifically trained persons.

The Office of Scientific Personnel has been set up in the National Research Council to serve in the war emergency. One of its functions is to assist in the recruitment of scientists for positions in war-supporting activities. It is in touch with demands from all types of activities and is in a position to refer an able scientist to employers engaged in urgent work at the present time.

Persons who are or who may be available for employment, who are experienced in research or applied science or who have substantial training in this field, are asked to write to:

M. H. Trytten, Director
Office of Scientific Personnel
National Research Council
2101 Constitution Avenue
Washington 25, D. C.

Employers are most interested in candidates trained in physics, mathematics, geophysics, engineering (especially electronics, communications, electrical, mechanical, chemical), and similar fields. However, registration is invited in other fields of importance to the war effort such as geology, bacteriology, and physiology.

Paper industry organized for pollution abatement

Recognizing that the development of treatment methods for paper mill liquid wastes is far from a solution, representatives of the pulp, paper and paperboard industries have formed the National Council for Stream Improvement, Inc., to conduct research and pool information on the subject. Formally organized in May, 1943, the Council was only recently activated with the opening of an office at 271 Madison Ave., New York City, and the appointment of Russell L. Winget as executive secretary and Harry W. Gehm as technical advisor. Mr. Winget has long been identified with paper industry association affairs, and Dr. Gehm was formerly research associate and assistant professor of sanitary engineering at Rutgers University.

Paper companies whose aggregate tonnage represents about 60 percent of the country's output already are represented on the Council. In addition to research on waste treatment processes, the Council will also concern itself with investigations dealing with recovery and utilization of waste by-products. Arrangements have been completed with the Mellon Institute in Pittsburgh for an extensive research program under the direction of Dr. G. D. Beal. The Council's program, which is based on a budget of over $100,000 for the first year, also provides for additional research projects at other universities.

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TVA engineers create Parker Memorial Fund

In memory of the late Theodore B. Parker and in recognition of his many contributions to the engineering profession, friends and associates met Aug. 7 at Knoxville, Tenn., to inaugurate an educational fund to be known as the Theodore B. Parker Memorial Fund. This will be made available to graduates of engineering schools in the seven Tennessee Valley states—Kentucky, Virginia, Tennessee, North Carolina, Mississippi, Alabama, and Georgia—for assistance in the study of advanced engineering at the Massachusetts Institute of Technology.

David E. Lilienthal, Chairman of the Tennessee Valley Authority, in a tribute, entitled "Parker: Exemplar of Engineering for Human Welfare," spoke for Mr. Parker's many friends and colleagues, as follows:

"From the time Mr. Parker was graduated from the Massachusetts Institute of Technology in 1911 until his passing April 27, 1944, while head of the Department of Civil and Sanitary Engineering at that school, the professional life of this talented, straightforward engineer was a succession of constructive accomplishments."

The memorial meeting was held with the cooperation of the Technical Society of Knoxville and was attended by representatives of all professional engineering societies, representatives from all departments of the TVA, and engineers and construction men from all over the Tennessee Valley.

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Navy plans supply depot for Stockton channel

A Navy supply depot, initial projects of which are scheduled to be completed by January 1 at a cost of $20,000,000, will be established near the deep water port of Stockton, Calif., the Navy Bureau of Yards and Docks announced recently.

Docks and berths for six ocean-going ships and scores of transit sheds, warehouses and other structures will be built, some immediately and some at a later date, on Rough and Ready Island in the channel emptying into San Francisco bay.

California AFL and AGC dispute referred to NWLB

Involving about 12,000 employes, a jurisdictional dispute between two AFL unions and the Northern California Chapter of the Associated General Contractors of America has been referred to the National War Labor Board with the insistence that labor adhere to its "no strike" pledge, the Tenth Regional WLB announced in San Francisco late in July.

Arising over jurisdiction and representation, the dispute involves the International Association of Machinists local and the Operating Engineers, local 3, which claims that the majority of employes doing "on site" repair work for the contracting firms are its members.

The Operating Engineers, who hold an agreement with the contractors for all mechanical field work, have been attempting to obtain an agreement for shop work now held by the machinists, with work stoppages as the consequence in several contracting firms.

Parties to the dispute were directed to restore and maintain the status quo of the employes as of Oct. 6, 1943, the date the dispute was certified to the WLB by the Secretary of Labor, as the case went to Washington.

JOBS OF THE WEEK

STORAGE, Norfolk, Va.

Bureau of Yards & Docks, Navy Dept., Washington, D. C., awarded a contract for additional storage for ordnance materials, corollary building facilities, Navy Supply Depot to Virginia Shipbuilding Co., Newport News, Va., at $864,000.

DWELLINGS, Los Angeles, Calif.

Belliveau Co., 720 South Palm Ave., Alhambra, will construct 196 frame and stucco dwellings, Watts District, by its own forces. The estimated cost is $704,000.

HOUSES, Van Nuys, Calif.

Myers Brothers, Los Angeles, Calif., have been awarded a contract for 207 frame and stucco dwellings by Biltco Corp., Los Angeles. The estimated cost is $828,000.

CHEMICAL PLANT, Houston, Tex.

C. F. Braun & Co., Houston, were the lowest bidders for construction chemical plant when Shell Oil Co., Inc., Houston, opened bids, at an estimated cost of $760,000.

DWELLINGS, West Los Angeles, Calif.

Overland Housing Corp., Lakewood Village, 640 dwellings. The estimated cost is $3,500,000. Paul W. Truesdale, Lakewood Village, will construct. John N. Douglas, Pasadena, Calif., is the architect.

AIR STATION, El Toro, Calif.

Bureau of Yards & Docks, Navy Department, Washington, D. C., awarded a contract for Marine Air Station to Robert E. McKee, Los Angeles, Calif., at $1,500,000.

Note.—Additional bidding and contract news on many projects large and small appear in the Construction News section beginning on page 209.

OBITUARY

oseph J. Bailey, 64, supervisor of t and bridge construction for Aus- Tex., died there July 26. He had a city employee for fourteen years.

illiam C. Kroening, 74, Milwaukee, , contractor and secretary of the aukee Mason Contractors' Associa- since it was organized in 1899, July 22.

. D. Turner, 73, for forty years oad bridge and building superin- ent at Brownwood, Tex., died at Antonio July 22.

ohn Lambert Neill, 78, retired civil neer, died at Gainesville, Fla., 22.

. H. Evans, 65, of Fort Worth, Tex., recently. He was a civil engineer the FWA and had been in the Worth regional office for two years.

rthur H. Dunlap, 69, a member of Texas State Board of Water En- ers at Austin since 1921, died there 22. He was a graduate of Cor- and the University of Missouri.

Prof. Charles Homer Baxter, head of departments of civil and mining ineering at the Michigan College of ning and Technology, died July 29. An alumnus of Michigan Tech, Mr. xter served as a county road engi- r and as a mining engineer for five rs after his graduation in 1902. enceforth until 1927 he was superin- dent of the Loretto Iron Co., and s then called back to his alma ter to head the departments of civil mining engineering.

Hugh Murphy McDowell, 59, of eville, N. C., construction engineer, d July 31. Mr. McDowell spent the ly years of his life in railroad con- uction work in the South and later a member of the firm of Reed and cDowell and the Asheville Construc- n Co. In recent years he had served business manager of the Asheville ving Co.

James C. Johnson, of Lenoir, N. C., nior engineer on the Grand Coulee m before enlisting in the Navy, died Camp Parks, Calif., July 26. Previ- sly he served two years in the Canal ne.

Quebec premier promises new bridge at Montreal

A new bridge, free from tolls, will soon be built across the St. Lawrence River within a few hundred feet of Victoria Bridge, at Montreal, Que., Premier Adelard Godbout declared, July 27.

"We have come to the conclusion that the Victoria Bridge cannot be widened to meet the necessities of the growing traffic," Mr. Godbout said. "The Jacques Cartier Bridge is too far away to give a satisfactory service to this part of the province.

"Our engineers have already begun a preliminary survey with a view to determining the site of the future structure," he said.

CONTRACTS AND CAPITAL

CIVIL ENGINEERING construction in continental United States totals $158,561,000 for July, an average of $39,640,000 for each of the four weeks of the month. This weekly average volume, not including the construction by military engineers abroad, American contracts outside the country, and shipbuilding, is 26 percent above the average for the five weeks of June, 1944, but 33 percent below the average for the five weeks of July, 1943.

Private construction, on the weekly average basis, tops last month by 47 percent and is 46 percent higher than in the month last year. Public construction is up 20 percent compared with a month ago as both state and municipal work and federal volume report gains. Compared with a year ago, however, public work is down 43 percent as a result of the 51 percent decrease in federal. State and municipal volume is 37 percent higher than in the 1943 month.

The July volume brings the 1944 seven-month construction to $1,050,391,000, a total 49 percent below the $2,062,540,000 reported for the period in 1943.

WEEKLY CONSTRUCTION SUMMARY

CONTRACTS

Continental U. S. Only
(Thousands of Dollars)

	Week Ending Aug. 12 1943	Aug. 3 1944	Aug. 10 1944
Federal	$23,781	$15,281	$24,362
State & Municipal	4,613	7,673	7,301
Total public	$28,394	$22,954	$31,663
Total private	3,379	8,864	7,844
TOTAL	$31,773	$31,818	$39,507

Cumulative
1944 (32 weeks) $1,121,716
1943 (32 weeks) $2,141,802

Note: Minimum size projects included are: Waterworks and waterways projects, $15,000; other public works, $25,000; industrial buildings, $40,000; other buildings, $150,000.

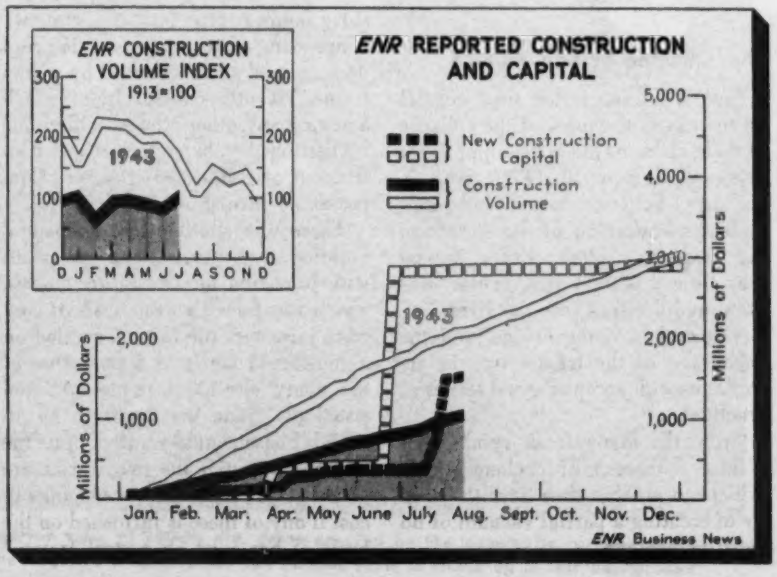
NEW PRODUCTIVE CAPITAL

Cumulative

	1943 32 Weeks	1944 32 Weeks
NON-FEDERAL	$270,932	$316,499
Corp. Securities	15,321	86,845
State & Mun.	95,478	90,194
RFC Loans	9,000	56,460
FPHA Loans	3,133	....
REA Loans	20,000	20,000
Fed.-Aid Hwy.	128,000	63,000
FEDERAL	$2,653,838	$1,263,800
TOTAL CAPITAL	$2,924,770	$1,580,299

ENR INDEX NUMBERS

Index base=100		1913	1926
Construction Cost	Aug. '44	300.42	144.41
Building Cost	Aug. '44	236.09	127.62
Volume	July '44	114.	50.


ENR CONSTRUCTION VOLUME INDEX
1913=100
1943
D J F M A M J J A S O N D
ENR REPORTED CONSTRUCTION AND CAPITAL
New Construction Capital
Construction Volume
1943
Millions of Dollars
Jan. Feb. Mar. Apr. May June July Aug. Sept. Oct. Nov. Dec.
ENR Business News

Comment and Discussion

Readers' opinions on matters that concern engineers and contractors

Metric Curve Tables

Sir: You have had mentioned in the last few weeks the matter of constructing some tables for use in South America on metric curves for railways. (*ENR* Dec. 30, 1943, p. 954 and July 13, p. 23).

The whole subject deserves a little simple explanation. Out of several years of experience long ago with metric curves we learned that the metric curve is based on the 20 meter chord, whereas our familiar railway curves are based on the 100 ft. chord.

Since 20 meters is two tenths or one fifth of one hundred, the familiar American tabular values we are accustomed to use are ready to use on metric curves. That means for any given curve such things as apex distance, external, middle ordinate, etc. may be computed as usual in the values in feet. Then divide by five or multply by 0.2 to get the metric value to use.

If any of the familiar American foot curve tables are present, they will be found sufficient if only the relation of the number 20 to 100 is remembered.

GEO. C. LOVE,
Engineer,
Durham, N. C.

The Chester Bridge Failure

Sir: Whatever is the final verdict on the cause or causes of the collapse of main spans of the Mississippi River bridge at Chester, Ill. (*ENR*, Aug. 3, p. 125), I believe that it should result in better anchoring of the trusses to the supporting piers. Every indication to me is that this bridge was lifted and dropped into the river.

The design of the bridge, and the anchorage of the trusses was in accordance with accepted good standard practice.

From the many freak results that I have witnessed of cyclones, it is evident to me that they have the ability of creating a partial vacuum of no mean percentage.

These highway bridges have wide highway floors. The floors are usually pretty well anchored to the supporting steel beams, and present a surface for suctional uplift many times greater than the horizontal surface.

When a bridge like the Chester bridge is built there is not one chance in several thousand that it will be struck by a freak cyclone. However, since the extra insurance of better anchoring could be provided, comparatively, at very small cost, I believe that such bridges should be anchored to the piers sufficiently to develop the strength of the trusses for upward forces.

It might also be advisable to establish a maximum value of l/r for tension members that would make those members more rigid than is now common practice.

W. L. SIX,
Construction Engineer,
The Mount Vernon Bridge Co.,
Kansas City, Mo.

Alternates in Bidding

Sir: I have noticed an increasing tendency of late on the part of letting authorities to request an undue number of alternates on public buildings.

I have in mind an elaborate one story monitor type building with two wings using a precast cement slab roof deck on steel purlins carried by a steel frame, recently out for bids: which among many other alternates had one requesting the change in price if constructed of reinforced concrete. Contractor to furnish design.

There was another job, a hospital building, two stories and basement with provision for two future stories, which was issued on the basis of concrete joist with tile inserts, carried on a reinforced concrete frame. One of the many alternates requested, consisted of "State the credit to be allowed if basement is omitted. State the additional cost if the two stories are added at this time. State the change in cost if any of these is furnished on the basis of bar joist on a steel frame." The possible combinations are eight. There were many other alternates.

In such circumstances one is forced to conclude that the letting authorities apparently do not know what they want or how much they have to spend; if such is the case the job is not ready for bidding as the additional details will confuse them still more. The outsider is forced to conclude that the office in question is unable to provide sufficient information for basic decisions.

From the contractor's standpoint such practices are most unfair. The cost to figure such work is far too high, the responsibility too heavy and chances for error too great. The probabilities are that the bidding will be so confused that all bids will be rejected and he will have the estimate to do over.

If work is awarded on such a basis with everything "wide open" there is no chance for a meeting of minds, and with the "Architect-Engineer" or "Owner's Representative's" decision being final the risk is too great. There are bound to be many omissions, duplications, etc., resulting in substantial extras, not subject to competition, and entailing much burdensome routine.

Unless Architect-Engineers as a group wish to eliminate themselves from the scene they should be prepared to assume the responsibilities contingent upon furnishing such services, and resist the pressure to resort to such unfair practices which in the long run will react to the disadvantage of all concerned.

ARTHUR E. ROWE,
Cleveland, Ohio

Air-Entrained Concrete

Sir: The brief resume published in your issue of March 9 of the discussion by the writer at the American Concrete Institute meeting Feb. 29 does not report my statements correctly.

The writer is reported as saying:

"Although agents whose only function is to entrain air do reduce the strength of concrete, there are agents particularly of the water-soluble foaming types, as contrasted to the resinous or fatty types, that will entrain air without impairing the strength. The principal need in this respect is for the agent to reduce the surface tension in the mix."

he above statement may convey to reader an entirely different mean- than that which the writer in- ed. The paper reads as follows: . . . air-entraining agents which ction only to entrain air will lower ngths. . . . that for a given cement or, lower strengths cannot be ided in air-entrained concrete if agents used are effective and func- only to entrain air."

o say that—

. . . there are agents, particularly he water soluble, foaming types, contrasted to the resinous or fatty s, that will entrain air without airing the strength"

that—

The principal need in this respect or the agent to reduce the surface ion in the mix"

o put an erroneous interpretation he writer's statements as actually le. The fact that a water-soluble ming agent will lower the surface ion of water or the liquid phase a concrete or mortar mix is not essarily a criterion of whether it or will not lower the strength of mix in which it is incorporated.

f the second sentence in the pub- ed excerpt from the writer's paper read as follows it would have been rate:

Although agents *whose only func-* is to entrain air do reduce the ngth of concrete, there are agents that will entrain air without im- ing strength"

he statements in the writer's paper cerning this point were:

The air-entraining agent in this (HP-7) is a homogenous mix- in powder form of the foaming or ing agent sodium lauryl sulfate, cement dispersing agent calcium in sulfonate, and a pozzolan. Since cement dispersing agent allows tantial lowering of the water- ent ratio, an increase in strength be obtained with a given cement or. This is accomplished with t 3 percent additional air in pav- mixes. On the other hand, air- aining agents which function only ntrain air will lower strengths."

is important to emphasize here the addition agent in this case ot just a "water-soluble foaming wetting" agent, but a mixture h, while it will entrain air, con- other ingredients that improve properties of concrete, especially the strength. Furthermore, if the "water-soluble foaming or wetting agent" were used alone in a concrete mix it would entrain air and would not increase strength over a corresponding plain mix with the same cement factor.

Our experience has taught us that of the known materials used, both in the laboratory and in the field, to entrain air in concrete, the water-soluble foaming or wetting agents are the best type for this purpose. Wetting agents should not be classified as "soaps" because they are not metal salts of fatty acids. As mentioned before, there is no relationship between the air-entraining qualities of an agent and strengths of the concrete in which it is incorporated. There is, however, a definite relationship between the amount of entrained air in concrete mixes and strength.

DONALD R. MACPHERSON,
Acting Director of Research,
Master Builders Research Laboratories,
Cleveland, Ohio

Concrete Dome

SIR: Considerable space was given to the failure of the first attempts at erecting a one hundred foot diameter dome by the pneumatic forming process (*ENR*, Dec. 2, 1943, p. 793, and Dec. 16, 1943, p. 871). Now that the building has been successfully completed and occupied, a few remarks toward this fact in your journal would be very gratifying to those of us who embarked on this venture.

Many of the press statements at the time of the failure were misleading to the public. At no time did the structure collapse. However, this seems to be the general impression conveyed.

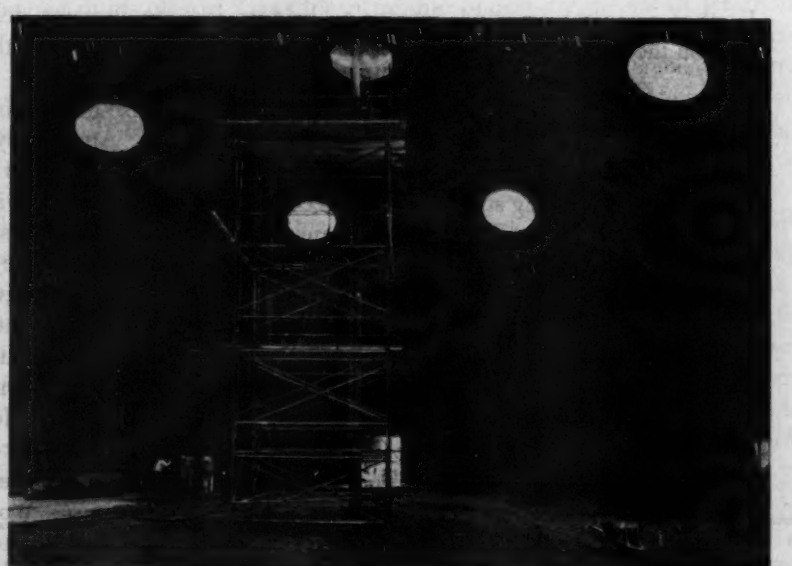
The cause of our trouble has been traced to one source. The airproofing compound used rotted the canvas form, preventing the maintaining of the required air pressure of 1½ oz. per sq. in.

A 1¼ in. coat of gunite, placed directly over the form, constitutes a secondary form upon which to place the reinforcing. As this coat was being completed, the canvas opened up in many places and finally gave way. The entire form was lost; however, the structural coats had not been placed.

A new form was built and performed perfectly. A pressure of 1½ oz. per sq. in. was used and no further incidents occurred during the completion of the building.

Due to the difficulty of analyzing the stresses in a dome where large openings are cut out, the city building department required a load test before issuing the final permit. A 47-ton eccentric load (40 lb. per sq. ft.) was placed on the upper portion. The deflection was only 0.007 in. The loading was accomplished by placing sand over the required area with the gunite equipment.

WALLACE NEFF,
Architect,
Los Angeles 28, Calif.



Interior view of 100-ft. dia. dome erected by the pneumatic forming process at Los Angeles. A quarter of the balloon form is rolled up in left background

EDITORIALS

VOLUME 133 NUMBER 6

August 10, 1944

The Chester Bridge Failure

CONFIDENCE IN OUR ABILITY to design structures safe against the vagaries of nature was again shaken late in July, when the central spans of a bridge over the Mississippi River at Chester, Ill., were blown from their piers and dropped into the river (*ENR* Aug. 3, p. 125). The bridge was almost new, having been completed about two years ago, and was built to modern standards of design. Coming so soon after the spectacular failure of the Tacoma Narrows Bridge, this failure cannot but reemphasize our limited knowledge of aerodynamic forces when applied to a bridge. The conformation of the valley at Chester may have been in part responsible for a combination of uplift and horizontal thrust that overturned the spans. The two 670-ft. continuous spans forming the main channel crossing were a little over 100 ft. above river level; to the west of the river is wide bottom land, while on the east side the land rises sharply from the water's edge to well above bridge level. In such a region, winds of tornadic character might develop a high negative pressure above the bridge floor. If studies based on this experience support the conclusion that uplift was an important factor in this failure, bridge design theories will have to be modified accordingly. (Further comment on wind damage to bridges is given on the following page.)

A Ninth-Inning Rally

NOW THAT CONGRESS has concluded its summertime recess or seventh-inning stretch and has reconvened, a strong ninth-inning rally should be launched by proponents of the postwar highway bill H. R. 4519 to insure its immediate enactment. Entirely too much time has been lost already through dilly-dallying and procrastinating Congressional procedure. One optimistic note regarding early passage of this bill stems from Congressman Robinson's statement from the floor of the House shortly before its recent adjournment. Congressman Robinson reported that he had definite assurance of leaders of the House "that the bill can be taken up quickly when Congress reconvenes and the delay in its consideration should not, therefore, be more than a matter of a few weeks". Congressional establishment of a workable postwar federal-aid highway policy, however, is critically essential before states, counties and cities can proceed toward the solution of complex legal, financial and engineering problems necessary for a sound postwar road program, that no stone should be left unturned in securing the early enactment of H. R. 4519.

Specifications for Personal Safety

A DROPPED SPUD WRENCH or a bolt sliding harmlessly off a "hard" hat has convinced many a construction worker that it isn't a sissy idea to accept head protection. Safety belts, hard-toe shoes and goggles come in the same category. For several years forward-looking contractors, led by the bridge steel erectors, have required that all their workmen in dangerous jobs wear proper safety clothing, which they have furnished, or made available at cost, the items needed. Aside from the humanitarian angle it has proved an excellent financial investment to keeping experienced men on the payroll instead of on the accident roll. Why not make such safety measures universal and mandatory by putting the requirements into the specifications of every job? The cost would be offset by lower insurance premiums as well as by less expense in training replacements for injured workmen.

Bad Business in Bidding

INVESTIGATION of a few absurdly low bids submitted recently on utility work reveals a curious practice on the part of certain contractors. They are, it seems, deliberately bidding way below actual cost "to keep the organization together" with the idea of taking advantage of the two-year spread clause in allowing losses in computing their income tax. Apparently they figure that heavy losses will pull them down out of high percentage tax brackets without much actual loss. Continuation of such practice can result only in harm to the contracting fraternity. The public can only surmise that contract prices have been too high, that contractors have gouged the nation in war work to become so rich they now can resort to deliberate losses to bring down their income tax. Knowledge of this condition would be perfect ammunition for advocates of WPA and day-labor operations looking for a defection on the part of contractors to further their own cause. Worse yet, before long, unreasonably low bids would establish a standard of construction prices that could not possibly be met by legitimate bidders. If contractors are willing to lose money

keep their organizations together, they had better send the boys fishing and charge it to overhead. Bidding at a loss is bad business.

Wind Damage to Bridges

DESTRUCTION OF TWO SPANS of the Mississippi River bridge at Chester, Ill., in a wind storm brings to mind the spectacular accident in Scotland in 1879 that did so much toward establishing wind pressure as an important element in bridge design. In that year, eleven 245-ft. spans and two 227-ft. spans of the Tay River Bridge were blown from their piers while a freight train was passing over the bridge. The British engineers who designed the bridge had made no allowance for the effect of a horizontal wind blowing against either the side of the trusses or against a train on the bridge. In fact, one of the engineers had written a paper demonstrating to his own satisfaction that such provision was unnecessary. French and American engineers, on the other hand, already were including a very considerable factor for wind pressure in their design. The designers of the Tay Bridge were very severely criticized for their failure to follow French and American practice during British Board of Trade investigation of the Tay Bridge accident, and the outcome of that investigation was insistence upon ultra-conservative wind loadings in the design for the Firth of Forth Bridge, then under way. Incidentally, what were probably the first model tests in bridge design were made in studies of the wind load on the Forth Bridge.

American practice at the time of the Tay failure, according to the late Robins Fleming in his classic monographs on wind stresses, was far ahead of British practice, due possibly to the spectacular destruction of six spans of a timber-truss bridge near Harrisburg in a wind storm in 1849 before the sway bracing had been fully installed.

The Tay Bridge failure was followed in 1905 by the destruction of two large and two small spans of a high viaduct at St. Paul under topographic conditions strikingly similar to those at Chester. The river there is at the foot of steep bluffs to which the viaduct ascended, but the roadway was 180 ft. above the river and it was a deck roadway instead of a through roadway as at Chester. C. A. P. Turner, in his analysis of that failure, estimated uplift as more than sufficient to lift the main truss off its tower supports. In the light of this, Fleming recommended that consideration be given to uplift on high bridges.

All these earlier conclusions were based on limited knowledge gained largely from uncontrolled conditions in the field. In the near future, using the great wind tunnels built during the war, it should be possible to supplant empirical formulas by formulas based on controlled studies of wind effect on large-scale models of bridges.

Industrial Wastes Treatment

ONE of the important responsibilities of industry in the years following the war will be the adoption of measures leading to the abatement of stream pollution. Federal legislation to compel such action, held in abeyance because of the war, is again under discussion in the Congress. However, regulatory statutes alone will not eliminate the pollution resulting from industrial waste discharges.

Realistic students of the problem recognize that the control of industrial pollution rests first on the development of adequate treatment processes for various types of waste. In this connection it is gratifying to learn that the paper industry has voluntarily established an agency by means of which studies and recommendations for appropriate waste treatment methods may be undertaken (see page 74). Known as the Council for Stream Improvement, Inc., the agency represents the producers of the majority of pulp, paper and paperboard tonnage in this country. Relatively small contributions from each manufacturer have made possible a sizable budget by means of which the council can carry on a broad program of research and consulting service among its members. Eventually the council hopes to develop effective and adequate treatment methods for the exceedingly complex wastes produced in conjunction with all types of paper manufacturing.

This type of voluntary, coordinated action by the paper producers bears emulation by other allied groups of industries who have common problems in waste disposal. Development of technical processes as well as legislative measures for the abatement of industrial pollution is one of the most challenging fields of endeavor in the postwar period in which manufacturers, sanitary engineers and public health officials can participate.

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Fig. 1. Side-hill cut for 7½ miles of jungle road was made by bulldozers and shovels. Spoil went over the side.

Jungle Roadbuilding in Trinidad

Commander Leonard Miscall
Civil Engineer Corps, U. S. Naval Reserve

***Contents in Brief**—Seabee troops built a road through mountainous jungles using bulldozers, shovels, dynamite and native labor to rapidly complete a difficult project. There are no fills on the road, every foot of the 7½-mile length being in side-hill cut where spoil, including the largest trees, was shoved over the edge to seek its own waste bank.*

ONE OF THE MOST DIFFICULT and ambitious engineering projects undertaken by the Navy Seabees and their Civil Engineer Corps officers, the 7.45-mile Maracas Road, cut through the mountainous jungles of Trinidad, has been completed after a seven months' day and night fight against torrential rains, landslides, and inaccessibility.

Requiring the removal of nearly 1,150,000 cu. yd. of rock from perilous mountain-side heights, the road was cut through virgin jungle without a fill in any section and with its entire length in sidehill, cut and benched to protect the location from the wash of tropical rains.

The Maracas Bay area has been known to white men since Columbus visited it in 1498, but until the Seabees brought American "know-how" to the construction of the new road, the only access to the area was by water, which in the Bay is continuously rough, or by a winding and extremely dangerous donkey trail through the jungle. Now, the area, which has been described as one of the most beautiful spots in the West Indies, is accessible over a 14-ft. paved strip with a shoulder to shoulder overall width of 24 ft. and nowhere exceeding a 10 percent grade despite its climb from sea level to El. 1,335 ft. in about two miles.

The new road, which connects the north coast with a modern system of highways radiating from Port of Spain, traverses mountainous country through its entire length. It was necessary to scale many vertical cliffs, some 300 to 400 ft. high. The road was built with the equipment on hand, some of which had already had been through two years of hard usage in other places.

The road has strategic values that cannot be discussed in this article and in addition gives Trinidad residents access to the excellent bathing beaches bordering Maracas Bay. Following the British request that the road be built, a Lend-Lease agreement was made for construction of the road in exchange for exclusive U. S. control over naval base property to the northwest. Work was started late in March 1943 by Navy contractors who had been working on the main base. This group had made only a bare beginning in two months when completion of the job was turned over to the Seabees in June 1943.

From June until mid-October 1943 only nominal progress was made, due to the pressure of more important projects on the base proper. In October it was decided to rush this road to completion so that it would be finished at about the same time as work on the naval base. The project, thereafter, was put under the cogni-

ce of the 11th U. S. Naval Construc- n Regiment. It was completed and cepted for the British Crown on ril 5, 1944.

From October on, all construction ivities on the Maracas Road were erated 24 hr. per day, and con- uction pushed from both ends of road. One crew commenced at an and highway known locally as the ddle Road. This starting point had cess from existing highways, but Maracas Bay end had access only sea.

Maracas Bay terminus

A group of fifteen Seabees was nded from a barge at Maracas Bay out Nov. 1, 1943 with lumber, tents, od and drinking water supplies. here they were to set up an advance se camp and live in the nearby jun- e until completion of the road. Their rticular assignment was to complete miles of road to grade in about months.

Bulldozers and shovels were ought in by barge, an extremely dif- ult operation as the sea in Maracas y always runs high, 6 to 8-ft. waves ing the rule rather than the excep- on. To get the first bulldozer un- aded from the barge it was neces- ry to build a ramp of sand by hand, hich washed away almost as fast as was built up. However, the first bull- ozer was finally landed and, after at, unloading operations proceeded ithout too much difficulty. This ad- nce base unit set up an additional mp adjacent to their own for native orkmen who came out of the sur- unding mountains looking for jobs.

Transport to the Maracas Bay crew as a continuous problem. Food and rinking water, as well as fuel and rts for equipment, had to be deliv- ed by barge. Many times the sea was high that it was two days or more efore material could be unloaded. hirsty men would often have to wait hours before their drinking water uld be landed from scows standing only 400 yards offshore.

The first operation after the survey as clearing the right-of-way and this as done by native labor under Sea- e supervision. Clearing tropical ngle is never an easy task, and the tives were particularly helpful in at many of them brought their own achetes and had the "know-how" of ashing through the undergrowth. hopping or sawing the huge tropical

Fig. 2. Pioneer road. A bulldozer went over such a cliff but it was retrieved and put back to work on this hazardous phase of construction operations.

hardwood trees, which grew thickly all along the right-of-way, was difficult and they were blasted out. Fortunately the terrain was such that trees, after being blasted, slid out of the right-of-way as the road is on steep side-hills throughout its length.

After the right-of-way was cleared, the Seabees started blazing a pioneer trail about 6 ft. wide and, in all cases, above the final grade. Bulldozers were the principal tool for widening the right-of-way to a point where shovels could sidecast the principal excavation.

In getting out rock, wagon drills had to be pulled up to the site with block and tackle or by bulldozers. The average depth of holes drilled was 20 ft. Whatever dynamite was available was used. Often the explosive was not of the right percentage to suit the character of the rock, but it managed to serve. After each shot, bulldozers pushed the broken material over the side. If the shot was a big one and the cut was deep, shovels rather than bulldozers were used, the precipitous nature of the ground making it easy to dispose of the rock.

All of the work was done during the rainy season, which meant about three

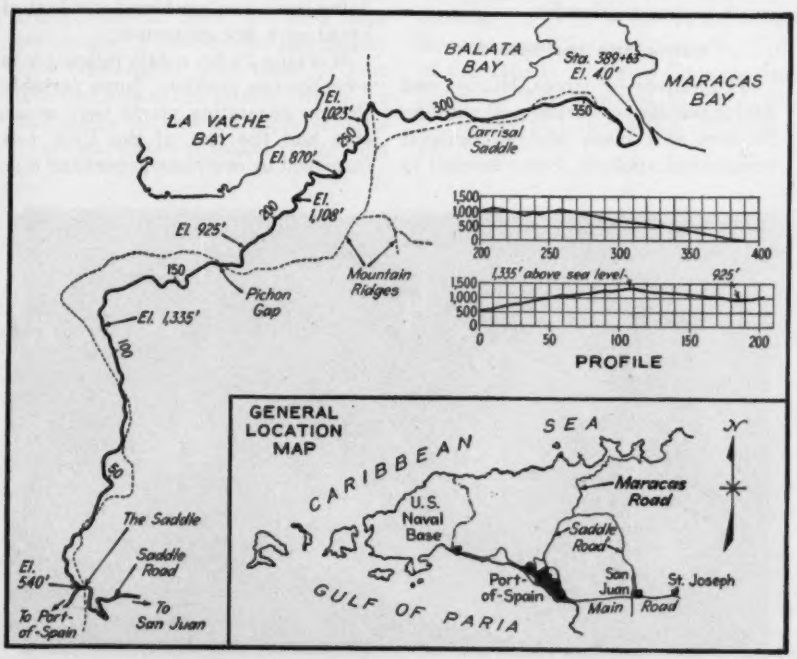


Fig. 3. The jungle road from the Maracas end rises 1,020 ft. in a little more than two miles, allowing very little relief from the ruling 10 percent grade.

Fig. 4. Native drillers, blasters and bulldozer operators on pioneer excavation.

rainstorms per day throughout the 4½ months tour of duty. Such weather conditions aggravated the wear and tear on equipment, so the group at Maracas Bay set up a shop and made all of their own repairs to equipment. Repairs were many, as none of the equipment was new and all of it had seen hard service on the base proper.

Construction problems on the Saddle Road end of the project were similar to those at Maracas Bay, except that the work was more accessible, as an existing road made it possible to truck supplies and machinery to the start of the road. However, workers were confronted with the same impediments of jungle and rain. Also, in this half of the road the rock cuts were much higher and harder.

Native help and hazards

The natives—Negroes, Hindus and Mohammedans—worked well with the Seabees and many showed unusual mechanical aptitude. Some learned to run bulldozers with considerable skill. They seemed to have no fear of machinery and appeared willing to "try anything once." Incidentally, the natives helped the Seabees in another way. They were skilled fishermen and would take to sea in native canoes that made one wonder how they stayed afloat but would bring back a mess of fresh fish, which now and then included a barracuda. Seabees purchased the fish from the natives with a few packs of cigarettes, gum or some candy bars. Occasionally a native would swap a 10-lb. fish for a sailor's white hat, which they seemed to admire very much. Some of the native women set up a laundry service and the Seabees were relieved of doing their own washing for a loaf of bread or a few cigarettes.

Working 24 hr. a day, lighting was a continuous problem. Some portable electric generating plants were available and the rest of the light was furnished by acetylene generating outfits. Good general lighting at night was necessary as many supplies had to be carried on the heads of the natives, "safari style," to the actual scenes of operation. These included diesel fuel, drinking water, drill steel and dynamite; yet, never was a native seen to drop any of the heavy loads carried in this manner.

It was spine-chilling, though, to see a native climbing over rocks with his bare feet, a box of dynamite under each arm and three or four boxes of dynamite caps balanced on his head. On another occasion, a native was seen carrying gasoline in an ordinary water-bucket on his head and at the same time nonchalantly smoking a cigarette. At such times it was best to keep quiet; a warning might make the native nervous.

Surfacing operations

Surprisingly, throughout the 7[illegible] miles of road only one spot, about a mile from the Saddle Road entrance, had any rock suitable for road material. A small portable crushing plant was set up near the location of this rock—a sandstone—and the plant operated 24 hr. per day throughout the life of the job. It barely was able to crush enough material for the 7½ miles of 8-in. thick, 16-ft. wide sub-base. In screening the stone of the sub-base, a portion of the earth and fines was left in the aggregate as a binder, which helped compact the sub-base when it was rolled.

Material for the base and the surfacing was secured from a quarry at the Naval Operating Base and hauled 11½ miles to the entrance of the project by 16-cu. yd. trucks, which traveled in convoys of five. Handling these convoys was not an easy task on Trinidad roads, which have a standard width of 14 ft. and where Crown Law allows a two-wheeled donkey cart the right-of-way. Despite this some 15,000 cu. yd. of crushed stone were hauled to the site in 20 days.

Paving was commenced at the Saddle Road entrance and pushed through to Maracas Bay without let-up, the whole distance being finished in 16 days. A sealcoat of asphalt emulsion was applied to the sub-base and then 3 in. of base was spread and road-mixed with asphalt emulsion. After this was compacted a 1½-in. thick surface was road-mixed with asphalt emulsion and rolled. The work required special planning since the par-

Fig. 5. Shovels generally cast spoil over the edge of the road for disposal, allowing it to seek its own angle of repose.

g had to carry the heavy traffic of one and asphalt trucks and other quipment as soon as it was laid. Pav- g operations were confined to day- ght hours.

In laying the pavement it was nec- sary to sprinkle the stone with water hich had to be hauled ten miles. The ad itself is located so high there is o water available from streams or rings. Three 10,000-gal. tanks for- erly used for gasoline at the Naval perating Base were set upon logs for sphalt storage. These were filled by a ariety of homemade tank trucks, built rom flat bed trucks with old steam oilers, containers off ships and one redge pontoon serving as tanks.

In retrospect

Maracas Road is unusual in several espects. It would be hard to find else- here a road of this length in which here is no fill in any section. Its loca- on throughout the entire length is in uts, and the road is purposely benched" to protect the location gainst the wash of tropical rains. Generally, the material encountered some one of the various types of chist. There is no prevailing dip to ny of the strata, and when a cut is pened there is now way of foretelling landslide. The area is such that land- ides are continually occurring and, lthough the back-slope was cut on bout a 10-on-1 slope, in many cases e face of a cliff has slid down so at the final slope is about 3-on-1. uring one day there were 19 land- ides varying in volume from 100 to ,000 cu. yds. In constructing the road here was 1,320,000 cu. yd. of excava- on, of which 1,150,000 cu. yd. was ock.

QUIPMENT USED IN OPENING THE MARACAS ROAD

-1½ cu. yd. shovels
-1¼ cu. yd. shovels
-¾ cu. yd. shovel
-1 cu. yd. clamshell
-D7 and D8 bulldozers
-12-cu. yd. scraper
-500 cfm. air compressors
-315 cfm. air compressors
-210 cfm. air compressors
-Light plants (portable)
-Wagon drills
-Jack hammers
-5-Yard trucks
-8-Yard trucks
-Rock crusher

Three natives were killed during e construction but these deaths were ue to their own negligence and were ot the result of construction acci- dents. No Seabees were injured be- yond the usual scratches and bruises which go with a job of this type. Three trucks and one bulldozer were lost over the cliffs, but the bulldozer and two of the trucks were later recovered and put back into service. The natives took considerable pride in working on the project and the high efficiency shown by them was due partly to the fact that there was a competitive spirit between the various shifts.

A book could be written on the in- genuity shown by the Seabees in keep- ing their machinery going. Two tem- porary repair shops along the right- of-way worked "around the clock" every day, with the result that some manufacturers would have a hard time recognizing a piece of their own equipment. After Seabees had repeat- edly taken parts from three or four different makes and installed them, the bulldozers showed the characteristics of several different makes rather than those of the original manufacturer. For hauling material to the site, trucks were borrowed from the Naval Oper- ating Base and the Army, and some- times were just "lifted" for a short period of time.

The Seabee personnel on this job was chosen from the 30th and 83rd U. S. Naval Construction Battalions. Carpenter H. B. Cobb, CEC-V(S), USNR, of the 11th U. S. Naval Con- struction Regiment, was in general charge of the project, assisted by Car- penter J. C. Gillean, CEC-V(S), USNR, of the 83rd U. S. Naval Con- struction Battalion and Carpenter R. T. Jones of the 30th U. S. Naval Con- struction Battalion. The office records and general planning were under the direction of T. B. McNeely, Jr., Chief Yeoman, and Anthony Sainato, Y1c, of the 83rd U. S. Naval Construction Battalion but assigned to the 11th U. S. Naval Construction Regiment for duty.

Fig. 6. What was accomplished by the jungle roadbuilders is evidenced by comparison of this view of the finished highway with the pioneer trail in Fig. 1.

Fig. 7. Schist rock formation, typical of those found on the Maracas Road.

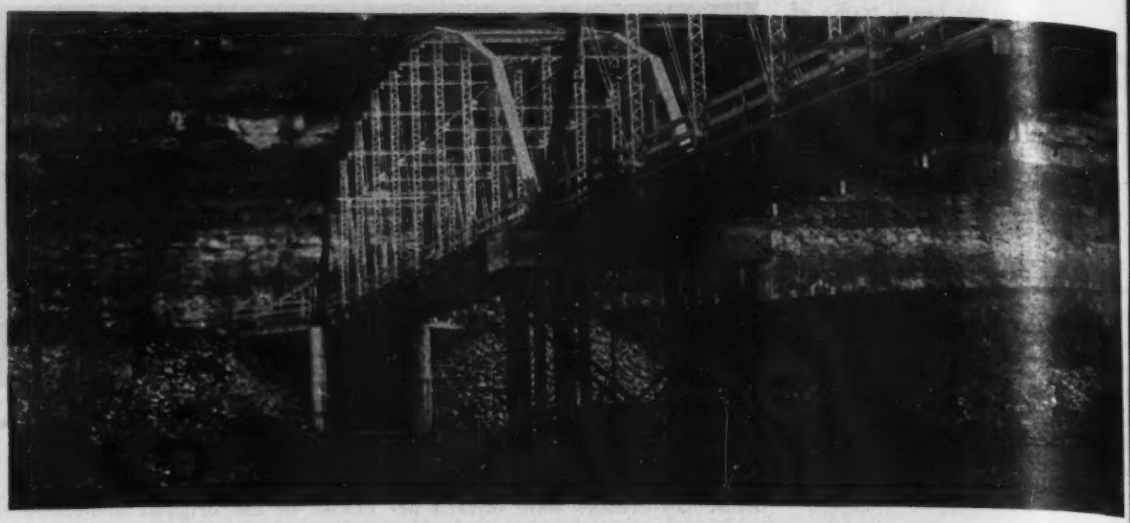


Fig. 1. Steel bearing piles driven without a cofferdam replace the central pier of a two-span truss bridge in Missouri.

Repairing a Bridge Pier in Deep Water

V. W. Enslow
Bridge Engineer, Missouri State Highway Department

MAINTENANCE AND REPAIR of existing highway structures is often as difficult as the original construction and sometimes more so. This fact was illustrated recently by repair of a Missouri bridge pier in deep water.

Floods early in 1943 severely damaged the center pier supporting two 190-ft. pin-connected steel truss spans over White River near Branson on U. S. Highway 80. The pier is located in Lake Taneycomo, an artificial lake formed by a dam some distance downstream. Consisting of two 5-ft. dia. concrete-filled steel cylinders with web bracing, the foundation was founded on thin laminations of limestone covered with about 22 ft. of water. Apparently, the layers of rock were scoured from under the downstream cylinder and impact on the upstream cylinder had caused the pier to tilt 18 in. out of line at the top and the downstream cylinder to subside 6 in.

Although the bridge was inadequate for extensive heavy traffic and was relieved of most through traffic by the use of a nearby crossing, it was desirable to maintain the structure for local use. The trusses are light, and the roadway only 15 ft. wide. These conditions did not warrant the expense of cofferdamming in the deep water to effect the construction of a new concrete pier or the repair of the base of the old foundation.

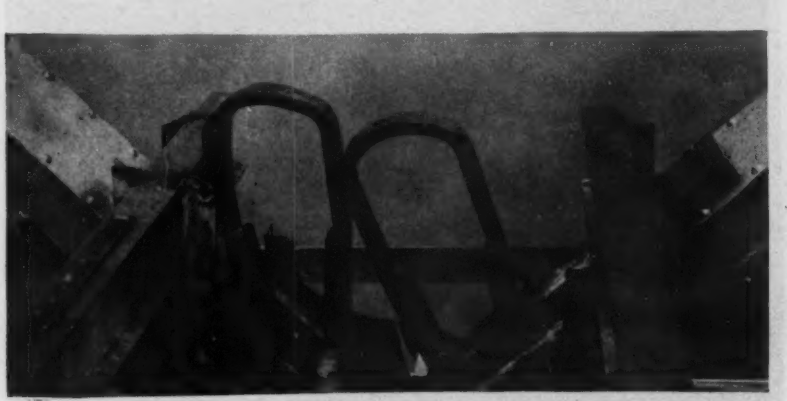


Fig. 2. Hitches to raise the trusses above the old pier were provided by welded straps encircling the end pins.

Piles replace cylinders

The procedure adopted was to drive six 10-in. 49-lb. steel piles around the perimeter of each old cylinder, and, after removing the top of the cylinders, constructing a concrete cap on the new piling. The piles were purchased in 60-ft. lengths, which provided a cut-off of a few feet. Delivered on a barge, they were set in place and driven by equipment operating on the bridge deck, the floor in the first panel of each truss having been removed.

Because there were no end floorbeams in the spans, the work of removing the load of the trusses from the old pier required installation of a jacking beam, as well as some means of transferring the lifting force to the trusses. The end pins in the trusses were only 6 in. above the concrete at the top of the cylinders, which allowed

little room for any lifting attachment.

To provide the lifting attachment, after openings had been cut in the end post cover plates over the pins, a 3x1¼-in. U-shaped strap was threaded under each pin and inverted U-shaped straps of the same size welded to these straps to form lifting links (Fig. 2). Jacking beams, provided with hardwood cushion blocks, then were fitted through the lifting links. The general arrangement of the scheme is shown in Fig. 3. The members marked *A* are pile cap beams transverse to the roadway and support the beams marked *B*, which are parallel to the roadway and support the four hand-operated hydraulic jacks used under each line of trusses to provide the lifting force. The jacks were extended to remove the load from the old cylinders.

Next the top of the old pier was removed sufficiently to permit the longitudinal beams, designated *C* in Fig. 4, to be placed under the truss shoes. The spans were shifted laterally to the original position, Beams *C* welded to Beams *A*, and the trusses lowered onto Beams *C*. During the jacking, temporary blocking was used at all times as a safeguard against dropping of the load due to failure of the jacks or other causes.

The portions of the cylinders above water level were cut away and the new concrete cap built, the beam grillage being encased in concrete.

Finally, the steel plate obtained from the old cylinders and web was used to construct a welded box about 9x26 ft. in plan and 5 ft. deep around the piling. Once complete, the tank was lowered to bear on rock and filled with stone to help stabilize the bent. To gain stability, the portion of the cylinders from the waterline down were left in place and the steel piling welded to the shells.

E. H. Krehbiel, of Columbia, Mo., was the general contractor. For the Missouri State Highway Department, C. W. Brown is chief engineer; and O. D. Chrisman, division engineer. The work was done under the direct supervision of J. R. Parker, project engineer.

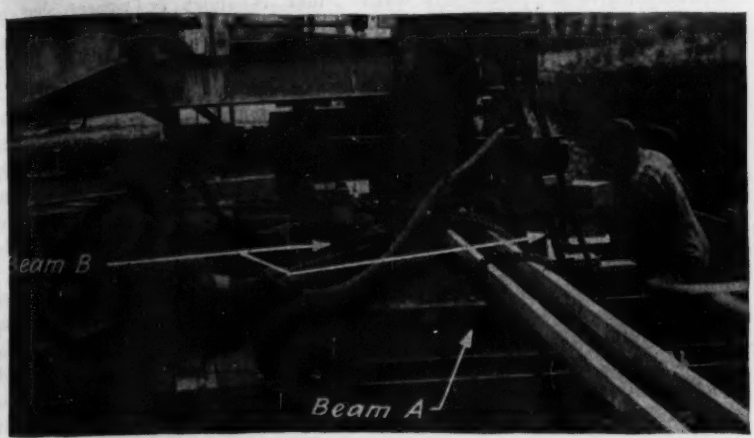


Fig. 3. Four hand-operated hydraulic jacks at each cylinder provided the lifting force to raise the trusses above the old pier. The load from the jacks is transferred to the beams marked "A," which are welded to the top of the six steel piles driven about each cylinder.

Fig. 4. After the trusses were supported on steel piles and the top of the old pier cut away, steel beams designated "C" were added under the old shoes to provide new support for the trusses. Later the beam grillage was encased in concrete.

Proper Pipe Sizes For Water Distribution

In the effort to fix upon economic pipe sizes in water distribution systems there is the temptation to use much too great a proportion of 4-in. pipe, according to George E. Booth, chief engineer of the National Board of Fire Underwriters, in speaking before the annual convention of the American Water Works Association. With the passage of time and the consequent reduction in carrying capacity, he said, the 4-in. pipe becomes altogether inadequate for the demands made upon it, even in ordinary residential sections.

Even where 6-in. pipe is used the situation may not be entirely satisfactory. Calculations show that a grid of 6-in. mains gives a local loss in pressure, for concentrated flow from a group of hydrants, which is four times greater than it would be if the grid was of 8-in. pipe and twice greater than with a grid of 6-in. and 8-in. pipe. Following this line of reasoning the National Board of Fire Underwriters has recommended: That the minimum size of pipe for residential districts be 8-in.; the 6-in. size to be used only where it completes a good grid and in no case in blocks longer than 600 ft.

In making extensions from a grid-iron system the 8-in. pipes should run as parallel lines, in the direction of the area of probable growth, stated Mr. Booth. Thus they will form, when cross-connected at intervals of 2,000 ft., a basis for a very strong feed, and there will be little need for cross mains larger than these necessary to meet domestic consumption demands.

Specifying Controlled Concrete

R. F. Moss
Vice-President, Scientific Concrete Service Corp.
Washington, D. C.

***Contents in Brief**—Present-day specifications are responsible for uneconomical and inferior concrete because of the lack of incentive for the producer to use accurate control methods. Specifications assuring improved quality with greater cost savings are suggested. In them emphasis is variously placed on strength determination, quality bonuses and profit sharing.*

LONG RECOGNIZING the structural and economic advantages of controlled concrete, engineers favor better control methods than are now in general use. Such control methods are available, and in his paper "Dollar Economies in Concrete Proportioning" (*Engineering News-Record*, June 17, 1943, vol. p. 906) the writer showed how accurate control can improve quality, at the same time making startling cost savings. However, such control methods are not in general use. Why?

The fault lies in the specifications. Accurate control always entails additional cost for equipment or personnel or both. Under the usual specifications all of the benefits of control accrue to the owner as no way is provided for the producer to recover the extra cost or to profit by accurate control methods. He, therefore, cannot use it; the owner gets inferior concrete and pays more for it than necessary. Also, the inspecting engineers often find that regardless of how carefully their work is performed its value is impaired and a limit on obtainable quality is imposed by inaccurate batching and proportioning equipment and methods for which the specifications are responsible.

A financial incentive

Moreover, the interests of the owner and the producer being at variance, such quality as the owner does get is only to be had at the high cost of meticulous inspection, often involving friction, much of which might be avoided if the interests of the two parties could be made more parallel; that is, if the specifications could be written to give the producer a financial incentive to do a better job.

The economic basis of the advantages of controlled concrete can be illustrated by the example shown at the bottom of this page.

Several types of specifications share the guilt. The most common type specifies minimum strength and also a minimum cement factor for each class of concrete. The minimum cement factors are usually so high that the concrete producer can meet strength requirements with the crudest of equipment and methods. Under such specifications he has no financial incentive to use accurate control.

EXAMPLE OF CONTROLLED CONCRETE SAVINGS

Assume 3,000 lb. concrete, test results for which, under ordinary control normally range between 3,000 and 4,200 lb. To get this result the mix must be designed to produce an average strength of 3,600 lb. which will require about 5½ bags of cement per cu.yd. Reduce the test range to 3,000-3,400 lb. and the design average becomes 3,200 for which about 5 bags will be needed. The saving of a half bag amounts to 25 or 30 cents. In both cases the result is 3,000 lb. concrete and the water-cement ratio is the same. The 3,000-3,400 lb. concrete, however, will contain less paste (s. g. approx. 1.7) and more aggregate (s. g. approx. 2.7) and will, therefore, be denser and weigh more per cubic foot than the 3,000-4,200 lb. concrete. Any engineer would prefer the denser and more uniform variety.

Such specifications directly encourage inaccurate batching methods and invite cheating in cement. An unscrupulous producer can reason that more cement than is needed to get specified strength is wasted. He knows that if he can deliver concrete that is short in cement, but has enough to pass strength tests, the chance of detection is small. So he is tempted to hold out as much as he can. It would be desirable to remove this invitation to dishonesty. Also, under all specifications of this type the inspecting engineer has the unpleasant duty of acting as a policeman, seeing to it that the specified quantity of cement is actually used.

Specifications that also give maximum water content, that specify quantity of each ingredient, and that specify by volumetric proportions produce similar results. All are usually loaded with extra cement to allow for wide variation in the w/c ratio caused by the usual inaccuracies of proportioning and batching, which accurate control methods would reduce to reasonable tolerances, and none include any financial incentive designed to insure the production of controlled concrete.

How can specifications be written to provide this incentive? Several methods are available. All of them should be based on performance and all should be subject to the final arbiter of the cylinder test as standardized for the various cement types. Some methods that suggest themselves are given here.

Straight strength specification

The simplest and most practical method is the straight strength specification. Some engineers object to this, claiming that it does not give sufficient consideration to such important qualities as durability, imperviousness, etc., and these qualities are supposed to be provided by in-

creasing the cement factor. Let us see if they are.

When the cement factor is increased it must be done in one of two ways:

a. By maintaining the w/c ratio and therefore also increasing the water content. In this case the quality of the water-cement paste, on which the desired qualities principally depend, remains exactly the same and the change only increases the proportion of paste to aggregates. If the mix is correctly designed, to produce specified strength and workability, at least enough paste to fill the voids in correctly graded and proportioned aggregates must be provided and there is no advantage in using more. On the contrary, it is generally recognized that excess paste is undersirable, principally because it increases volume change.

b. By changing the w/c ratio. Exactly the same results may be obtained by changing specified strength and there is still no advantage in using excess paste.

Make cement count

When it is desirable to use a high cement factor for durability or for any other reason why not get, without additional cost, the strength which that cement factor ought to produce? Calculate the strength that the desired cement factor and workability should produce under good control and specify that strength, without the minimum cement factor.

This would have an almost magic effect on the producer as his profit would then depend on how closely he can control all of the variables. He would obtain a scientific design for every mix, would divide his aggregates into several sizes to control grading and guard against segregation, and would install the best water control system he could get. Also, the invitation to cheat in cement, as well as the possibility of so cheating, would be removed. The product would be judged entirely by tests and the inspecting engineer would no longer have to be a policeman.

Specify by strength, with strength requirements adjusted to produce all desired qualities, and controlled concrete must follow.

Many engineers and organizations have endorsed the straight strength specification. Significant among these endorsements are:

1. The Uniform Building Code, published by the Pacific Coast Building Officials Conference, which is now used by over 300 cities in the United States and Canada. This code recommends the use of the standard w/c ratio—strength curve and specifies that concrete subject to freezing and thawing shall have a minimum 28-day strength of at least 3,000 lb.

2. The Joint Committee Report which approves the straight strength specification and gives tables for correlating strength requirements to exposure conditions. These requirements vary from 2,800 pounds for exposed structures in mild climates to 5,000 pounds for salt water-line concrete in severe climates.

3. The American Society for Testing Materials which recently published a new specification for ready-mix concrete, Alternate 1 of which specifies substantially the same procedure and uses tables adapted from the Joint Committee Report.

The indorsement of the straight strength specification by the highest of authorities is one of the most important developments of recent years in the concrete field.

The A.S.T.M. specification above mentioned is authoritative and may be used. A straight strength specification can be written more simply as follows:

"The contractor shall be responsible for the production and delivery of concrete that will meet the test requirements of paragraph ——."

Note how effective such simplification can be. In this case the inspection is reduced pretty much to the making and breaking of cylinders. The producer, driven by a money incentive, provides the rest.

Scientific minimum cement specification

On some government projects the specifications give minimum cement factors that are apparently taken directly from the w/c ratio curve without additional factors of safety and the producer has to provide sufficient cement to meet strength requirements. The minimum cement factors are, therefore, based on approximate laboratory accuracy. This is essentially a strength specification and accurate control is required even to approach the minimum cement factors. It is producing excellent results and producers like it. It could be specified as follows:

"The contractor shall be responsible for the production and delivery of concrete that will meet the test requirements of paragraph —— and that shall conform to the minimum cement requirements of paragraph ——."

Owner control specification

If circumstances make it desirable for the engineer to manage the control himself and make his own mix designs he can specify, by name or by performance, the control method to be used and arrange for the owner to supply or pay for the cement.

This would provide control equipment of desired accuracy but would not give a contractor any incentive to make effective use of it. Such a specification would be useful principally as a guide to procedure on projects where the construction is done by the owner. It would be specified as follows:

"Concrete mix designs will be provided by the ——— and may be varied by him. Cement will be provided by the owner."

Quality bonus specification

The incentive lacking in the owner control specification can be provided by giving the producer a bonus for uniformity in cylinder tests. For example, successively larger bonuses might be provided when 80%, 90% or 95% of all cylinder tests for each class of concrete are within a limited range, say 300 pounds. This would provide a real incentive if the bonus is large enough to be of interest. Bonuses of 10¢, 15¢ and 20¢ per cubic yard for 80%, 90% and 95% of the cylinder tests falling within a restricted range would produce remarkably uniform concrete in many cases and would reduce inspection costs. Also, the uniformity so attained would usually save the owner more than the bonus, as the illustrative example will show.

The specification would be the same as for the owner control with the following addition:

"The owner will pay the producer a bonus of —¢, —¢, or —¢ respectively, per cubic yard when —%, —%, or —% of all cylinder tests, for each class of concrete, are within a range of ——— lb. psi."

The engineer can use the usual minimum cement factor for each class of concrete but give it some other

name, such as basic cement factor, and provide that lesser quantities may be used, when justified by test results, in which event the value of the cement saved would be divided in some fixed proportion between the producer and the owner. It could be specified as follows:

"The contractor shall be responsible for the production and delivery of concrete that will meet the test requirements of par. ——. When justified by test results the basic cement factors specified in par. —— may be reduced, in each case subject to the approval of the owner, and the value of cement so saved will be credited in the proportions of ——% to the owner and ——% to the contractor."

Other methods will undoubtedly suggest themselves but after each has been considered it is doubtful if any of them will be found to equal the direct simplicity and effectiveness of the straight strength specification.

Cylinder tests would govern

Inasmuch as all these methods depend on cylinder tests and as these tests would be the principal remaining source of controversy, the methods used in making them should be carefully specified. The Uniform Building Code, previously referred to, contains the following provisions:

"Specimens for concrete cylinder tests shall be taken at the place where the concrete is being deposited and shall be taken, cured and tested in accordance with the "Standard Method of Making and Storing Specimens of Concrete in the Field," designation C31-39[1], of the American Society for Testing Materials."

Uniformity saves dollars

It will be noted that in discussing these methods of obtaining scientifically controlled concrete a good deal of stress has been placed on cement saving. It is here emphasized that the cement so saved is only the cement that is normally wasted, literally thrown away, by the lack of uniformity in concrete produced by ordinary batching methods, the total value of which must amount to many millions of dollars annually, and that concrete quality is always improved by any control method which improves uniformity. It is also emphasized that all work of importance, regardless of the control method or type of specification used, should be done under the direction of a competent concrete engineer.

The final difficulty in obtaining scientifically controlled concrete is that specifications seldom include minimum performance requirements of batching equipment, apparently on the assumption that with adequate inspection, good concrete can be made with any equipment. It would be just as logical to expect an engineer to make an accurate survey of a Wall Street building site with a surveyor's chain and compass.

Accurate batching equipment needed

Although the necessity of adequate inspection by trained personnel is unquestioned, it is the accuracy of the batching equipment which determines the limit of the accuracy with which concrete can be produced. Unless the scales are accurate and designed for rapid, accurate batching; unless the weigh-man knows, from batch to batch, how much water is already in the aggregates; and unless he is able to follow moisture changes from batch to batch in his weighing operations, accuracy, either in water content or in the dry weight of aggregates, is obviously impossible regardless of the amount and the quality of inspection. Specifications covering the minimum performance requirements of batching equipment should include:

1. The weighing tolerances of the batching scales with provision for periodic checks on these tolerances. The latter are needed because even good scales can get out of adjustment and a small error in a setting can be magnified into a large error in the weigh-hopper. It may be here noted that many batching scales are equipped with small poises reading as low as 2 to 5 lb. which is often far below the accuracy tolerance of the scale and which gives an impression of accuracy that does not exist. The best batching scales weigh to a tolerance of about 1/10 percent of capacity. Many scales using these small poises have tolerances of more than 1 percent of capacity. A separate scale for cement is desirable because the capacity and therefore the tolerance can be lower than that of the aggregate scale, and carry-over errors are eliminated as explained in par. 5, below.

2. Operating tolerances in weighing with some means of checking them. The latter is needed because weigh-men can be, and often are, careless, and with the usual equipment an error cannot be detected unless caught while being made. The best check on this is an automatic record, which will reveal all weighing errors. Automatic cut-off for cement and water and, in large operations, for all ingredients is desirable and should be specified as this eliminates an important part of the human element.

3. Means for quick determination of the water content of aggregates. This is necessary because when water content varies rapidly, as it often does, a determination that takes 10 minutes or more to make is of little practical value. By the time the result is available the aggregate tested may be in the job and the water content of the next batch may be quite different.

4. Means for the rapid, preferably automatic, adjustment of the scales to compensate for the varying water content of the aggregates. This should be simple enough for the average weigh-man to understand and use unless a technician is continually available to give him instructions.

5. If the weighing is done manually a dial that will show the progress of loading from beginning to end is desirable. The usual specification provides that an indication should be given for the last 200 lb. of loading. Loading speed is usually 600 to 800 lb. per second so this gives the weigh-man less than a half second in which to slow and stop the loading, which often causes over-weight. Devices that oscillate are seldom allowed to come to rest in fast loading and when this happens the delivered weight is only an approximation. With the dial scale the progress of loading is continually visible, which makes the combination of speed and accuracy possible.

In addition, on all batching scales an error in one ingredient is carried forward to the next and when all ingredients are weighed on the same scale this causes serious errors in cement. With a dial scale such errors are visible and can be corrected. Without a dial they are not caught.

6. Means for determining the gradation of aggregates. This must be done by a technician but it is desirable to have the necessary equipment in the batching plant since prompt

rrection for gradation changes is an portant part of control.

All of these features are essential the production of accurately con-olled concrete and should be speci-ed. The batching and control equip-ent may be specified as follows:

By name.

"The contractor will provide —— eighing, batching and control quipment and use it as directed by he owner. (For this the owner will llow the contractor an extra of —¢ er cu.yd.)"

By performance.

a. All weighing equipment shall conform to the weighing scale requirements of the U. S. Bureau of Standards, Handbook H-29 and such conformance shall be checked at not less than —— week intervals.

b. Each weighing scale shall include a visible dial which will accurately indicate the condition of loading at any stage of the weighing operation from zero to full weight of each ingredient.

c. The equipment shall include means for determining the amount of free water in aggregate samples, which shall be capable of making a determination in one minute or less, said determination to be accurate to the nearest ¼ percent of sample dry weight.

d. The equipment shall include batching scales on which the specified dry weight of aggregates and total weight of water can be set and which are capable of automatically adjusting these weights to compensate for varying percentages of water in the aggregates without the use of calculations, tables or charts; and which, when used with the equipment specified in par. c, will be capable of delivering these specified weights within tolerances of ¼ percent of dry weight for aggregates and ½ gal. per cu.yd. for water, regardless of varying water content of aggregates. (A separate scale shall be provided for cement). Cut-off of cement and water (all ingredients) shall be automatic and controlled by the scales.

e. The equipment shall include an automatic graphic recorder, capable of being locked and of graphically recording the weight of each ingredient delivered to each batch. It shall also include means of identifying each batch on the graphic record and be capable of recording the moisture compensation made in weighing aggregates and water.

f. The equipment shall include means for the accurate determination of aggregate gradation.

With equipment that will meet these performance requirements, and with the money incentive offered the producer in the suggested specifications, the following results appear certain:

1. A positive improvement in concrete quality, the degree of improvement depending on the quality now being obtained.

2. A reduction in the cost of concrete, the amount of reduction depending on the degree of control now being obtained.

3. A reduction in the cost of inspection and a decrease in friction between inspectors and producers.

4. The elimination of cheating in cement.

5. An improvement in the competitive position of concrete as a structural material.

Tacoma Report Recommends Widereaching Projects

A comprehensive report containing a series of recommendations, not only for the city of Tacoma, Wash., and the Puget Sound area, but for the Pacific Northwest region as well, is under consideration by Tacoma's city council. It presents a number of specific recommendations for highways, public buildings, parks, schools, and other improvements.

The report has been in the process of composition since January, 1942, by the mayor's research committee on urban problems, and is entitled, "Tacoma, The City We Build." Recognizing the necessity of complete areal planning, the committee says, "It has become increasingly evident that no metropolitan area in the Puget Sound country can be considered apart from the Northwest region as a whole . . . that when changes take place or alterations are made in one section of such a region, they have direct bearing upon future use and activities to which all the region is subjected."

First in the report is a series of 29 recommendations for the city of Tacoma, dealing with matters of health, welfare, recreation, public buildings, natural resources, economics. For example, the report recommends that a Metropolitan Sanitary District be established in the interests of public health; on the other hand, an adequate produce wholesale market easily reached from all quarters should be provided.

Several recommendations have to do with education and recreation, touching upon provision of neighborhood park-playfields, relocation of high schools and construction of a new library and civic auditorium. Several others deal with construction of freight and passenger airport facilities, and development of east-west and north-south truck highways to relieve traffic congestion on other streets and highways. Downtown parking facilities are discussed, and elimination of pollution from all state waters comes up for consideration and recommendations.

Recommendations for the Puget Sound area suggest need for and location of truck and passenger car highways and for dual purpose highways for easy access and exit purposes; discuss need for more scenic highways; propose decentralization of all suitable types of industry along the proposed highway system to encourage domestic agricultural production; outline a program to prohibit industrial or human pollution of all streams; and suggest state subsidies to promote and sustain anti-pollution regulations through municipal and cooperative industrial and residential sewer and drainage districts.

Recommendations for the region suggest, among other projects, the following: agricultural and marine research in the fields of food, raw materials and mineral resources; development of an efficient system of east-west and north-south highways; provision, both legal and monetary, for encouragement of railroad modernization in both rolling stock and yard facilities; fostering of water transportation of bulk freight between the Columbia river and Puget Sound by means of a Columbia-Puget Sound sea-level canal; development of airport facilities for private, public and freight vehicles.

Substantial Temporary Construction Used for a Naval Training Station

Thomas H. Creighton
Alfred Hopkins & Associates, Architects-Engineers
New York, N. Y.

***Contents in Brief**—The use of concrete block walls and pile foundations makes the buildings at a naval training station at New York of special interest among temporary war structures. Special care was used to tie walls and wood floors and roof together. The sewage plant was designed and located so that the city can use it after the war.*

TWO SPECIAL CONDITIONS affected the design of a naval receiving and training station completed early this year near New York City. One of these was the scarcity of structural timber, while the other was the waterfront location of the station, and both required that more than usual consideration be given to the materials and methods of construction used. As a consequence, all of the buildings are on piles, the grade beams are of reinforced concrete, and the exterior walls are of concrete block. Among the utilities, the sewage plant was designed so that it could be taken over by the city after the war.

Built on a former golf course, adjacent to a peace-time resort hotel, the project includes all facilities for the housing, feeding and training of the enlisted men. In addition to the usual barracks, mess hall, service, classroom and hospital buildings, there is a large recreation structure designed around a 2,500-man auditorium. Barracks house 224 men each on two floors, while the mess hall can accommodate about 2,000 men at a time. Beam-and-column framing characterizes most of the structures but in the recreation building bowstring trusses of 112 ft. span are required, supported on piers built up of concrete block filled with concrete.

Walls of concrete block

Masonry block walls were used for all of the buildings to save lumber. Moreover, masons as a trade were more available than carpenters. While the masonry construction cost slightly more than frame buildings would have (other experiences of the architects at that time indicated a differential of about 6 percent), it has other advantages, particularly in maintenance.

High pressure steam-cured 8-in. blocks were used because of the need for immediate and continuous delivery, and extensive analyses were made to determine the stability of this type of wall under wind and lateral forces. To utilize the inherent stiffness of the roof decks to the fullest extent, the flat roofs were designed as horizontal girders, with connections carefully detailed to transfer stresses from the deck to the end walls. In some cases, cross walls were introduced to serve as supports for the roof deck-girder.

Windows act as expansion joints

Even though the buildings are considered temporary, it was decided to reinforce the block walls at critical points to minimize cracking. Long experience with this material indicated to the architects-engineers that a very small amount of reinforcing properly distributed will accomplish this. Two 1¼-in. bars were used above and below windows, and additional reinforcing was provided when an analysis of the wall elevation indicated unusual stresses due to a change in section or interior framing. At the roof level, double wood plates were used to tie the building together and to act as a lintel over window openings. Thus the windows act as expansion joints for the top section of the walls, and greatly reduce the stresses throughout the entire wall.

The selection of masonry as the material for wall construction also helped determine the use of piles. The foundation conditions presented an unusual problem. Borings and test pits disclosed that the entire site had been filled with successive layers of fine sand, silt, and old marsh land. There seemed to be no relative stratification, and the profiles drawn between the borings showed clearly that the ground was a conglomeration of these materials, with lenses of each occurring at various levels, and usually for short distances.

Pile foundations

Platform tests were made to determine whether, under these conditions, it would be possible to rest the buildings on spread footings designed for a very small soil pressure. However, piles finally were decided upon since any other foundation, it was felt, might result in settlement that would be objectionable even for temporary structures. Since concrete block walls were to be used, settlement would be particularly undesirable. Wood piles were used and, since the groundwater level was near the surface, only the top part of the piles was treated. This was done by stripping the bark from the tops of the piles above ground and giving them a field treatment of creosote oil.

As shown in the accompanying illustration, a continuous grade beam of concrete, supported by the piles, was used to carry the exterior masonry walls. Piles for the interior columns were extended to the first floor level to support directly the first floor wood girders.

In addition to the pile driving, foundation preparation included extensive grading, about 70,000 cu.yd. of earth being moved on the 67-acre plot. The top soil was stored and used

or finish grading, and sufficient sod was saved from the greens and fairways of the old golf course to cover the 8 acres of the central drill field.

Saving critical materials

As stated, these buildings were designed at a time when a number of materials were on the critical list. One result of this was that nonreinforced concrete was used for all road and walk construction as the best solution to a design problem which called for inexpensive, durable and noncritical materials on a flat site with a sand subgrade. Heavy duty roads were built with a 7-in. slab. Medium duty roads for light delivery trucks were made 5 in. thick tapered to 7 in. at the edges, while walks consisted of a 5-in. slab. Darkening agents were used to reduce glare and lessen visibility from above.

The plumbing installation also reflected the critical material situation. Plastics were used to a considerable extent, as for shower heads and flush pipe connections; the loop system of venting was employed wherever possible; and vitreous china rather than enameled iron fixtures were employed.

Group heating units used

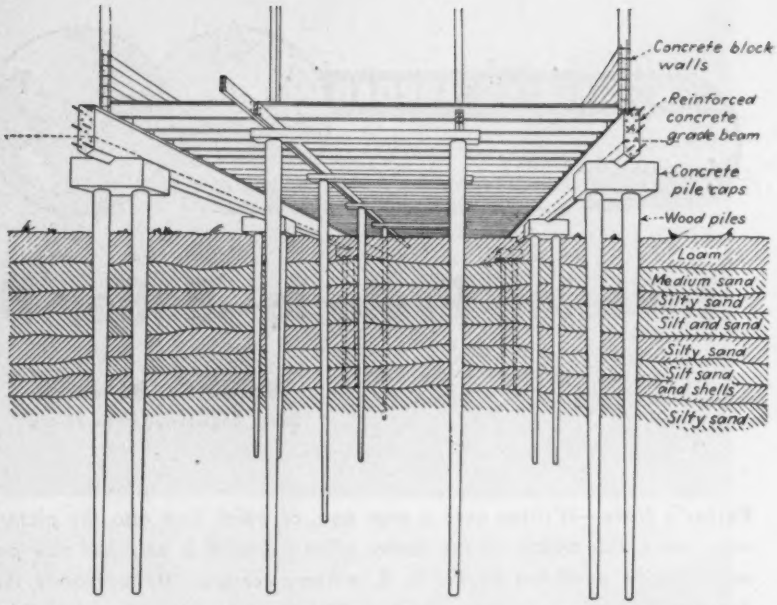
Normally a project of this size would have had a central boiler plant to suppply stream for all purposes. In this case, however, it was impossible to obtain boilers of sufficient capacity, while on the other hand individual heating plants for each building were considered undesirable. Hence, an intermediate solution was adopted, using several smaller boiler plants, each serving a group of from four to six buildings.

Boilers are of cast iron, operating at 5 lbs. pressure, fired by automatic stokers burning soft coal.

Water and sewage

Water had to be provided for the station since local city supplies were already overtaxed. Accordingly, an artesian well was drilled to 1,400 ft. and equipped with an 800 gpm. deep-well pump. Extra water for fire fighting is obtainable from the city's mains.

Existing local sewage disposal facilities were also inadequate so that a complete disposal plant was built, designed and located so that it can be used by the city if the Navy's facilities are no longer needed after the war.



Details of a Navy barracks building of uncommon design in which pile foundations and concrete block walls are used. Piles under walls are in pairs, capped to support a concrete grade beam, while single piles in interior rows extend up to the floor framing.

Two concrete sedimentation tanks providing a 2-hr. detention period were built. The effluent is discharged through a chlorine contact chamber and through a 16-in. cast iron outfall sewer into an inlet of the ocean. The sludge is drawn off into two heated digestors, with floating covers, built of concrete and a face of 8-in. concrete block for insulation.

Sludge passes into glass-enclosed sand beds from which the drainage is discharged into the city's sewers. Gases collected in the digestors are used to heat those structures and a central control building.

Work speeded by special shapes

The architects-engineers were given two weeks in which to prepare complete working drawings and specifications for this project. The time was met, and a contract was awarded calling for completion within 120 days. Grading started the day after the contractor was authorized to proceed. Three days later the first piles were driven. Various methods of speeding the operation were employed. For example, the concrete block was manufactured in various special shapes to eliminate cutting on the job. Insulation board and gypsum board, which was largely used for sheathing because of the shortage of wood, were manufactured to the exact lengths and widths required. All cutting possible was done at central points. This was true of lumber and millwork, and even plumbing piping was cut in a central shop and delivered assembled as much as possible. All sash and doors were prefitted before being delivered to the job.

Administration

Alfred Hopkins & Associates, New York, were the architects-engineers for the project, and the general contractor was William L. Crow Construction Co., New York. The work was accomplished under a contract of the Bureau of Yards and Docks, Navy Department, as represented by the Public Works Officer, U. S. Navy Yard, New York. Capt. W. M. Angas (CEC) USN, was the officer-in-charge at the start of the contract, and he was succeeded by Capt. R. R. Yates (CEC) USN. Lieut. Comdr. A. E. Eckberg (CEC-V(S)) USNR, was resident-officer-in-charge at the site.

Complete coordination through the life of the project resulted in a difficult operation being accomplished quickly and well. The Bureau of Yards and Docks supplied standard plans for the buildings as well as other standard design data. The architects-engineers adapted the standard plans and details to the concrete masonry construction.

ENGINEERING ABROAD AS SEEN BY ENR EDITORS

Invasion Prelude—Bailey Bridge Training

Waldo G. Bowman
Editor, Engineering News-Record

***Editor's Note**—Written over a year ago, at which time also the pictures were taken, this article on the Bailey military bridge is only just now permitted to be published by the U. S. military censors. Unfortunately they deemed it necessary to delete that part of the text describing the bridge, as well as all of the pictures that show any of its details. Nevertheless there remains enough of the original story to portray an invasion training procedure that the Engineer troops in England embraced with remarkable enthusiasm and efficiency. Moreover, there are appended to the article information and pictures released by the British from which the reader can get a fair idea of the makeup of the structure itself.*

LONDON, JUNE 25, 1943—Day after day, U. S. Engineer combat companies are bridging England's Thames River, only to dismantle their handiwork and try again in a constant effort to improve their proficiency in the use of the Bailey portable bridge, a British military item that has already proved its utility in actual warfare. I recently witnessed, as the first and only American civilian so far thus privileged, the erection of a five-span Bailey ponton bridge by 115 men from a combat company in the remarkable time of 32 min.; a new record, to replace the existing one of 31 min. held by another company, was in the making when a floorbeam, inadvertently inserted upside down, caused a slight delay. But the demonstration was spectacular in the extreme, and only tended to increase the rivalry to excel that existing among the various bridge building companies.

It should be pointed out that th 32 min. represented only the time r quired to assemble the bridge when a of the parts were laid out beforeha on a low, smooth riverbank, devoi of trees and in daylight. In actua combat operations, one might esti mate that an additional 2 hr. woul be required for the initial prepara tions, but if trucks, tanks and othe equipment can be rolling across major-size stream within even 3 hr after the Engineers go to work there is cause for acclaim.

The Bailey bridge is an unusuall ingenious and versatile structure. O pony-truss type, it may be used in sin gle spans up to 170 ft., supported on the river bank, or it may be ponton-supported in multiple-span layouts to cross any width of river. Furthermore, by various groupings of its standard-size truss panels, its load capacity may be progressively increased to accommodate 70-ton vehicles.

ENR Staff Photo

Ponton-supported Bailey bridge of five spans which was built in 32 min. by U. S. Engineer troops in England.

ENR Staff Photos

dge building on the "double". Top, bringing up the stringer panels for a floating span whose trusses and floorbeams are place. Bottom, span nearly completed, ready to be moved into line with the "landing" span being rolled out over r bank. Note the earnestness and enthusiasm of the American Engineer troops in these pictures.

This grouping of trusses is the outnding characteristic of the bridge, hich was described briefly in *Engiering News-Record* in the July 20, 44 issue, vol. p. 6. Thus, a single ss, a double truss or a triple truss de by side) may be used; or the uble truss or triple truss assembly y be used in two-story layouts. By ese different schemes, the capacity r a given span may be increased, the span may be lengthened for a ven load. [Editor's Note: At the me this was written censorship uld not permit mention of the ree story layout mentioned on the next page. This can be used in single spans up to 240 ft. whereas the 170 ft. figure referred to on the previous page relates to the two story trusses.]

One cannot see one of these bridges assembled for the first time without being impressed with its potentialities in a war involving fast moving and progressively heavier vehicles. Its parts are not numerous, and since they are all standard for bridges ranging in capacity from 10 to 70 tons, supply and transportation problems are greatly diminished. And of equal importance is the fact that it is speedily erected. These advantages were readily apparent at the demonstration that is the subject of this article.

It was a spectacular exercise even to its setting: The Thames, lazily moving between hard, flat, grass-covered banks that ended abruptly at the water's edge as though sliced by a huge knife; neatly stacked piles of truss frames, floorbeams, stringer panels and deck planking, strategically located at the five points of assembly, two on one bank, three on the other; long wooden pontons parked in pairs against the banks at three of the points; a rubber ponton ferry just up-

stream, being pulled rapidly back and forth by jeeps on either bank as it transported vehicle-mounted guns and other equipment to simulate support for holding the bridgehead; groups of visiting army officers, including the commanding general and many high-ranking engineer officers; and, as a background, hundreds of Engineer troops in their blue-gray dungarees lying on the grass in a huge semicircle to watch the show.

The atmosphere was not unlike that which pervades a packed stadium just before the kickoff. The demonstration, in fact, closely resembled a relay race in which the batons, passed from one runner to another, were pieces of steel so heavy as to require 2 to 6 men to carry them.

A whistle blew, and the men dashed to their positions. The end spans were begun on land, on the bridge alignment, the three intermediate spans in the water at the river's edge about 100 and 200 ft. away, upstream. For each of these intermediate spans, four-man crews carried a floorbeam at a dog-trot to each of two pontons parked against the bank, and returned at top speed for another load. They were followed by six-man crews with the truss panels. Other men connected these truss panels to the floorbeams while two-man crews brought in the stringer panels. As the first bay steelwork was completed, the outboard ponton was pulled streamward, widening the gap between the pontons, the back floorbeam sliding across the near ponton to its far side.

How a three-wide Bailey truss looks end-on, frames on the top chords and raker braces between the webs giving lateral stability. The jack is being used to permit installation of the rocker end-bearing.

Here movement was arrested until another bay could be erected and the procedure repeated. As this work was going on, other men had carried deck planking into position, installed the sway bracing and raker braces, a made fast all the connecting pins a clamps. So rapid was the assemb that the men on the lines moving t outboard ponton were never idle f a moment until the span was co plete.

In the meantime, the end span known as "landing" spans were bei assembled on the ground, and progre sively moved forward on rollers cantilever over the river bank, t progress being checked by lines pa out from deadmen. One of these spa used a double truss (being longer th the others) so that extra operatio including installation of the bra frames between the top chords, w involved. But progress was hard less rapid than elsewhere.

With all spans complete, the po ton-supported assemblies were pull into the bridge alignment by lines tached to dolphins in midstream. T crews guided and pinned the conne tions that made these spans contin ous while two other crews attend to the connections to the landi spans. As these latter spans w moved forward on rollers on t bank, men hung on the rear ends provide counterweight against ti ping, and to guide the connections the outer ends home.

With the bridge thus made co tinuous across the river, jacks we inserted at the land ends to permit r moval of the rollers and installati of the base plates or abutment shoe The ramp sections were placed either end and, as perspiring me jumped clear, a heavy truck rumble across the decking, signalizing co pletion.

It was, as the general remarked the company commander, "a goo show." And as a final piece of sho manship, the troops, who had watch and cheered the spectacle, marche three abreast across the bridge a on to their billets. That is, all did e cept those who were ordered to b gin dismantling the bridge. For t morrow another gang must have try at that 31-min. record, and a other chance to improve its familia ity with Bailey bridges. It is i portant work, for there are rivers the continent of Europe that will soo be in need of just such structures.

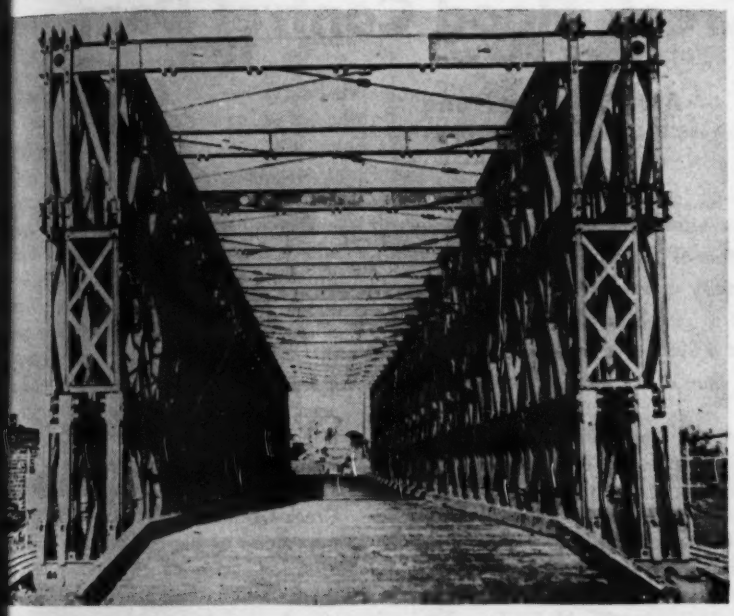
Photos on these two pages from British Information Services

British Royal Engineers place the stringer frames of a Bailey bridge in Italy, while floorbeam is being brought in behind.

Additional Bailey bridge facts

The following information and t pictures of the Bailey bridge on the

ley bridge in Italy in which three tiers of trusses are used at the center where nding moment is greatest, balance of bridge being only two trusses deep. This idge was cantilevered across this gap as shown in ENR July 20, 1944, vol. p. 61.



e three-high, three-wide truss assembly is used for heavy loads on medium ans or light loads on long spans. Tiers of trusses are connected to one another y bolts, which take the horizontal shear. Floorbeam members are pressed into rvice as top lateral struts in this structure somewhere in England.

o pages were recently released by e British authorities.

Named after Donald Coleman ailey, of the British Ministry of upply, its originator, the first ex-erimental Bailey bridge was tested n 1940. Subsequently it was used in orth Africa, Sicily and Italy, the ampaign in the latter country requir-ng the building of an average of two ailey bridges a day toward the end f 1943. It is also credited with play-ing a big part in the more recent successful military advances beyond the Normandy beachhead.

Called the "panel" bridge by Amer-icans, the Bailey bridge is also stand-ard U. S. Army equipment and com-ponent parts, manufactured in both Britain and the United States, are in-terchangeable. It may be used as a clear span between abutments or it can be supported on pontons, its as-sembly being the same in either case despite differences in erection pro-cedure.

Basically the bridge is assembled by repeating a standard 10-ft. section, composed of 17 parts, including welded truss panels, floorbeams, stringers, floor planking, etc. Field connections are by pins, as between the trusses, or by clamps, as between the floorbeams and the trusses.

As shown by the accompanying illustrations, the two floorbeams in each 10-ft. truss panel rest on the double-channel bottom chords. Holes through the webs of the floorbeams permit the insertion of carrying bars, by which the members are readily moved into place. The stringers, too, are readily handled, being in the form of shop-welded panels contain-ing three stringers each.

The great advantage of the Bailey bridge is that its standard sections can be assembled into structures of a large variety of sizes and capacities. Thus in the lightest bridge a single truss is used each side of the roadway. If additional capacity is needed, either one or two trusses are installed out-side of the first one. Finally, double-tier or triple-tier layouts of trusses may be employed for heavy loads or long spans. It is said that the bridge can be used for clear spans up to 240 ft.

Lateral stability of the trusses is provided by raker or knee braces running from the top chord down to the floorbeams. In double or triple truss layouts, panels of bracing join the top chords to tie the several units together.

Parking Meter Revenues Hit by Rationing

Parking meter revenues are suffer-ing, particularly in eastern cities, be-cause of gasoline and tire rationing, reports the Municipal Finance Officers Association. While the situation is not yet serious, June revenues per meter dropped 12 percent in rationed states from June, 1941, figures, and 5 per-cent in other states. A survey of 125 cities showed that the decline in June from last year has averaged almost 8 percent.

When classified by rationed and non-rationed states, revenues dropped in 60 of the 75 rationed cities in June as compared with June, 1941, and in 36 of the 50 non-rationed cities.

Fig. 1. Downstream face of dam showing outlet culvert portal structure and stone fill over toe drain.

Mosquito Creek Flood Control Dam

Alva J. Armstrong
Engineer, U. S. Engineer Office, Pittsburgh, Pa.

***Contents in Brief**—A mile-long shallow earth fill creates a vital new unit in the storage-reservoir, flood-control system of the Mahoning River. A 9,040-acre reservoir of 107,000 acre-feet capacity assures 1944 low-water supply to war industries. Water storage began 4½ months after breaking ground. The clearing of 2,600 acres of woods and 1,600 acres of brush land required more money and more manhours of work than did dam construction.*

CONSTRUCTION in 4½ months of the Mosquito Creek dam on a tributary of the Mahoning River assures the needed low-water supply for vital war industries in eastern Ohio. The new dam and reservoir supplement the Berlin dam and reservoir completed early in 1943 on another tributary of the Mahoning. The accompanying map shows the location of the new and previously existing reservoirs of the Mahoning valley which is a part of the Beaver River basin in which are the important Mahoning, Shenango and Beaver rivers and their wide-spreading tributary streams. The whole system is finally tributary to the Ohio River.

This map orientation is important to observe. Although the immediate provision of the Berlin and Mosquito Creek reservoirs was in a sense a war measure they are essential elements of a broad regional plan of storage-reservoir flood-control and low-water stream regulation in a highly industrialized area. It is primarily as war measures that the two new dams and reservoirs are considered here. Besides giving additional flood protection they assure full low-water supply for the operation of essential war industries in the Mahoning valley at full capacity in 1944.

Added storage volume

Berlin dam was substantially completed early in 1943 and the reservoir was filled with water in the winter and spring of that year. All the stored water was exhausted for low-water regulation of the Mahoning River during the remainder of 1943. The complete filling of the reservoir temporarily impaired its usefulness for flood control; its exhaustion showed clearly the urgent need for further reservoir capacity. This was undertaken by constructing the Mosquito Creek reservoir begun in August 1943 and completed in 4½ months to a stage where water storage began. Final finishing was scheduled for July 1944.

On Mosquito Creek, about 9 mi. above its mouth as shown by the map, the gentle valley slopes made possible a reservoir of 107,000 acre-ft. and an area of 9,040 acres by the construction of a dam only 47 ft. high at the deepest fill. Also, because a wooded swampy depression in the Mosquito Creek-Grand River divide near the upper end of the reservoir (see map) afforded, without change, a natural wasteway, it was practicable to construct a dam without a spillway. Reservoir area and capacity are therefore distinctive in respect to magnitude of necessary dam structures. Reservoir area conditioning was, however, a major operation due in part to probable future use of the reservoir for an additional water supply for the city of Warren, Ohio.

The storage capacity at El. 904 m.s.l. of 107,000 acre-ft. is equivalent to 20.6 in. of runoff from 97 sq. mi. of drainage area. Of the total storage, 64,000 acre-ft. have been assigned for continuous low-water regulation, with an additional 11,000 acre-ft. from the flood-control capacity to be released for the same use in sum-

mer and fall. For flood control it is proposed to reserve 33,000 acre-ft. of storage for winter and spring and 22,000 acre-ft. for summer and fall, corresponding to 6.4 in. and 4.3 in. of runoff respectively. A minimum pool of 10,000 acre-ft. at El. 886 m.s.l. has tentatively been established. Should Warren, O., decide to draw on the reservoir for water supply the draft is estimated at 16 mgd. or about 25 cfs.

It is estimated that the 33,000 acre-ft. of storage reserved for flood control will take care of a ten-day volume of water equal to the maximum flood of record which occurred on Mosquito Creek on March 26, 1913. This flood had a peak discharge of about 4,950 cfs. at the dam site. If the maximum intensity of the storm which produced the 1913 flood had been centered over the Mahoning valley, it is believed that a flood volume of about 50,000 acre-ft. would have occurred. If such a flood should now occur the excess water would discharge through the wasteway and the dam outlet without damage to the new Mosquito Creek dam. Studies made by the army engineers indicate that the wasteway should be left in its natural state and that the construction of dikes, weirs and other appurtenances

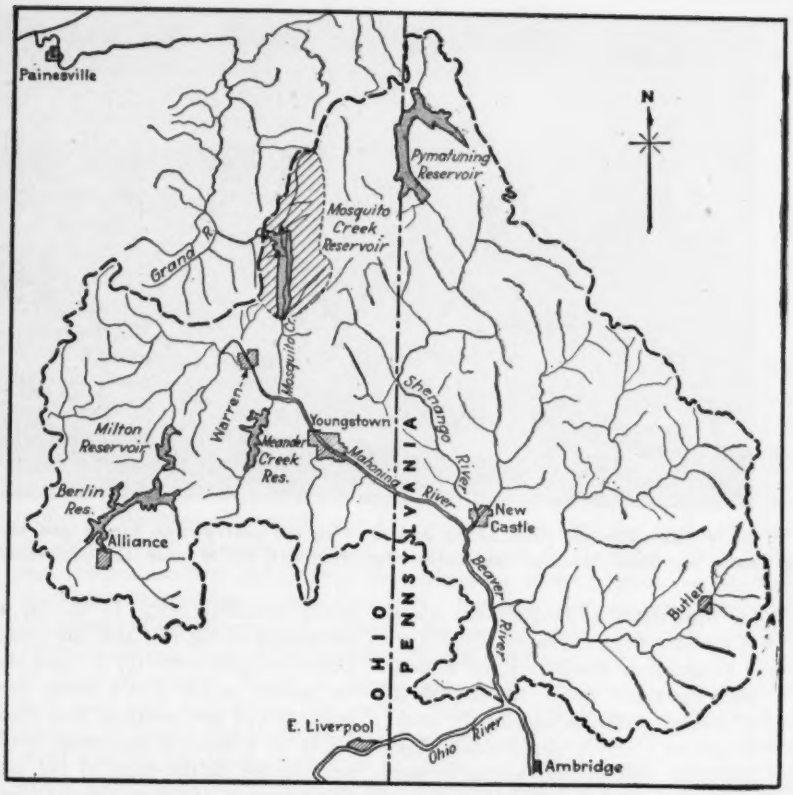


Fig. 2. New Mosquito Creek reservoir of the Mahoning River system is an important unit in the planned flood-control and low-water regulation of the highly industrialized Beaver River basin.

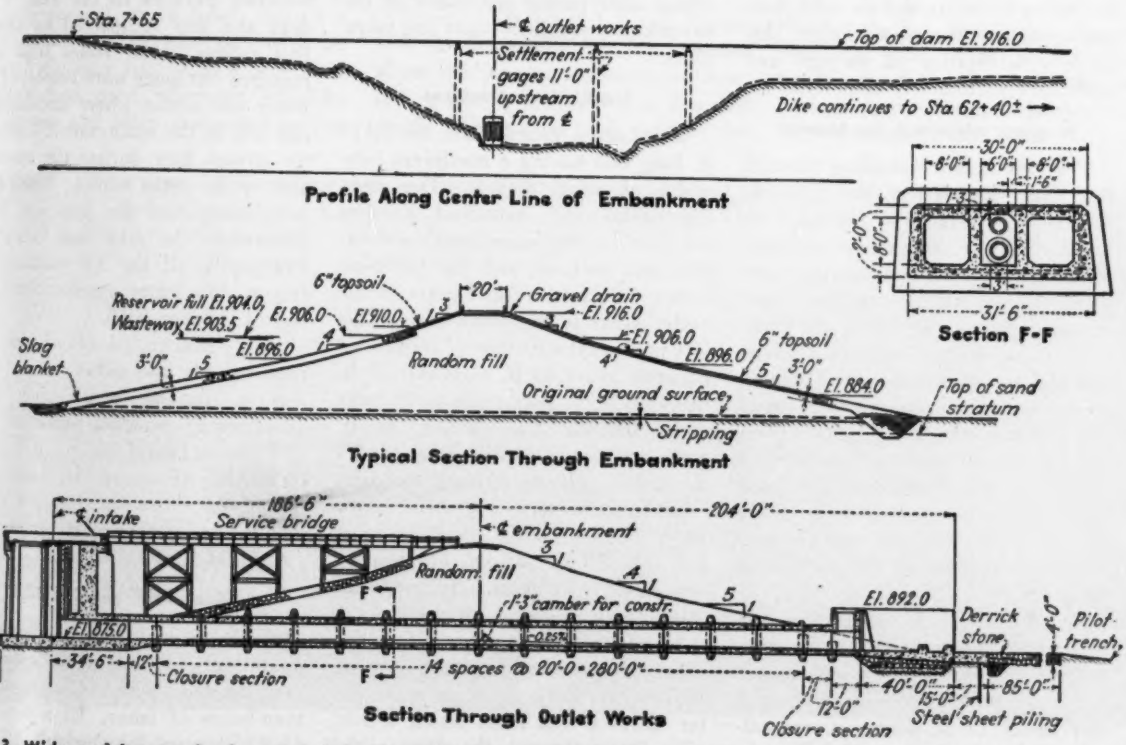


Fig. 3. Wide and long embankment and simple outlet structures of Mosquito Creek dam flood an area of 9,040 acres with a maximum fill of 47 ft.

Fig. 4. The upstream slope of the dam showing the quarry-rock facing and the inlet tower. The inlet has three sets of gates for flood flow, for low-water regulation and for Warren, O., city water supply, respectively.

for controlling or limiting the width of the flow is unnecessary.

Foundation conditions for a dam were extremely poor. About 100 ft. of glacial materials overlie the rock. These are variably consolidated clays and silts with thinner strata of pervious sand and gravel. Hard, compact, impervious glacial till underlies the unconsolidated sediments. In view of these subsurface conditions and the flat valley to be crossed an earth dam was considered the most suitable. This made consideration of seepage and settlement particularly important.

Seepage minimized by blanket

Pervious layers extending through the dam foundation are possible sources of artesian flow but an overlying relatively impervious stratum, on which the dam structures were founded, and which was made continuous upstream by filling the existing stream channel with impervious material, serves as a protective blanket to prevent destructive reservoir seepage. The dam is further protected from damage due to reservoir seepage by a well-filtered foundation drain of limestone rock which extends along the toe of the dam and taps the pervious stratum nearest the surface of the ground.

Because of quicksand pockets extreme care was required in locating the outlet works. Inlet tower, sluices and outlet portal rest on a stratum of clay about 12 ft. thick. It was calculated that the sluice conduit directly below the center of the embankment would probably settle 1¼ ft. due to the weight of the fill; that the intake would probably settle 0.7 ft.; and that the outlet portal would settle very little. It was also assumed that about 0.2 ft. of horizontal movement could be expected at the ends of the conduit structure. To minimize the possibility of setting up dangerous stresses due to settlement the end closure sections of the sluice conduit were concreted after partial settlement of the enbankment and inlet tower had taken place.

Simple dam structures

The dam is rolled earth fill 5,475 ft. long and having a maximum base width of about 430 ft. The main dimensions and structural features are shown by the accompanying elevation and sections and the half-tone views. The interesting feature in the outlet works is the intake tower. This is a polygonal structure of reinforced concrete about 49 ft. high and 50 ft. through. It has removable trash racks and bulkheads. Two pairs of 4x8-ft. gates, each pair opening into one of the 8x8-ft. culverts through the dam, provide for reservoir control. Two 24-in. diameter gates, which also open into the 8x8-ft. culverts, provide for low-water regulation. In addition three 3x4-ft. gates at different elevations provide for possible future use in supplying water for the city of Warren, O. From these gates the water enters a well from which a 3-ft. pipe passes through the dam in the gallery of the culvert structure. The gallery has room for a second 3-ft. water pipe if it is required. Gates and operating mechanism are of modern pattern.

Dam construction was begun the first part of August 1943. The fill was completed in October from borrow areas immediately above the dam. The fill was moved and placed in 6-in. layers (consolidated) by scrapers hauled by tractors. Each layer was crowned parallel to the axis of the dam and was compacted by sheepsfoot rollers. Four roller trips were required but more were employed and water was added where necessary. A gap left in the main-dam fill allowed for stream flow during the construction of the outlet works. When these were completed the gap was filled. Meanwhile the dike was completed. Practically all the fill required for impounding water was finished by the end of October 1943.

Only 5,400 cu. yd. of concrete were required for the outlet works. This was a five-bag mix using 1½-in. (maximum) crushed limestone, glacial pit-run gravel and 6.3 gal. of water per bag of cement. All the concrete tested well above the required 28-day flexural and compressive strengths of 700 lb. and 4,500 lb., respectively.

Reservoir conditioning

Reservoir conditioning was a major operation. Clearing alone cost more than the dam itself and required more man-hours of labor. Of a total area of 8,150 acres from which all trees, slash, brush, logs, fences and float-

able material were removed, 2,600 acres or 32 percent were wooded, 1,600 acres were brush and the balance was tillable and pasture land. In addition to this clearing about 1,550 acres of land was cleaned of all deadfall, slash and other floatable material and over 170 mi. of fence were removed. All buildings and other structures were removed and the cellars, vaults and wells were filled and left in a free drainage condition. Arrangements have been made by the city of Warren to sterilize all vaults and animal refuse within the reservoir area. This work of clearing up the building sites was performed to prevent the formation of stagnant pools as breeding places for mosquitoes during low-reservoir stages and to assure a supply of potable water for Warren, O.

The clearing operations were rather thoroughly worked out. Hard woods having a minimum diameter of 6 in. and soft woods with a minimum diameter of 9 in., both 9 ft. or over in length, were salvaged. The logs were cut to the greatest possible straight lengths, not to exceed 24 ft., to enable the buyer of the timber to procure lumber of the most salable lengths. The felling of trees and the cutting and trimming operations were generally carried on by hand, though a pneumatic saw was used on one of the small clearing contracts. Local farm labor was used wherever possible. Farmers and other interested parties were permitted to take free of charge all timber smaller than that required to be salvaged. A sizable quantity of this timber was cut up for cord wood. Other portions of the small-sized timber was cut up for cord wood. Other portions of the small-sized timber were used for ax handles, stirring poles and blocking. The market for the small-sized timber was limited and when sold the sale price was usually not much higher than the cost for salvage.

It was difficult for the contractor to secure and maintain an adequate supply of labor to carry on the work at the rate of progress needed to complete it within the contract time. The continual storage of water during much of the time that work was in progress made it necessary to clear the low lying areas first and to keep the work ahead of the rising water. About 10 percent of the laborers, all of them experienced woodmen, were brought in from Minnesota. Many of these men were used as foremen. The men brought in from a distance were quartered and fed by the contractor in a camp which was constructed in the clearing area. The average clearing force employed when clearing operations were in full swing was over 600 men.

About 10,000,000 b.ft. of timber will be salvaged. Of this amount about 95 percent is hardwood consisting mainly of oak, beech, elm and maple. The timber was sold to the highest bidders, who installed several saw mills throughout the area. Tractors, trucks, horses and skids were all used to bring the logs to the mills and stockpiles. Gin poles and cables were employed to good advantage for loading and unloading the logs.

Reservoir conditioning also involved the changing of about 31 mi. of highway and the removal of two cemeteries.

Directing personnel

The work at Mosquito Creek dam and reservoir is under the supervison of the U. S. Army Engineers. The Office of the Division Engineer, Ohio River Division, Columbus, O., acquired the land and contracted for the relocation of the highways and utilities in the reservoir basin. The planning of the project, construction of the dam and appurtenances and the clearing of the reservoir area are under the direction of the U. S. Engineer Office, Pittsburgh, Pa. Colonel Gilbert Van B. Wilkes is District Engineer and Captain Wilfred Bauknight is head of the construction branch, with the writer as assistant in immediate charge of the Mosquito Creek project. Gilbert P. Fleetwood is resident engineer at the site of the work. D. D. Mullett, contractor, Pittsburgh, Pa., constructed the embankment and outlet works. Practically all of the clearing work was performed by Herman Holmes, contractor, Crystal Falls, Mich.

Fig. 5. Typical clearing operation in the wooded area covering 2,600 acres or about 30 percent of the reservoir basin. Ten million feet board measure of lumber were salvaged, 95 percent hardwood.

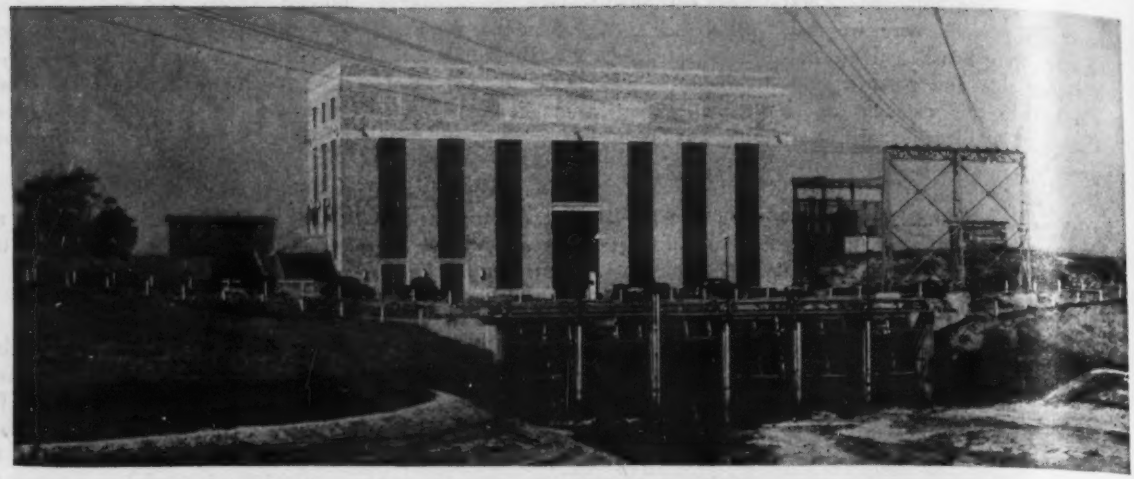


Fig. 1. Large pumping plant completed at Memphis, Tenn. to protect industrial area from Mississippi River floods.

Memphis Prepares for Its Next Flood

***Contents in Brief**—Earth-fill levees and two large pumping stations at Memphis, Tenn., will protect essential war industries and public utilities from floodwaters of the Mississippi River. Sand-filled, steel sheet pile cells required to support the concrete pumphouse and heavy pumping equipment.*

ALTHOUGH most of the city of Memphis, Tenn. lies well above flood stage of the Mississippi River, certain districts are inundated during high water. Two recently completed portions of a flood control project, built by the Corps of Engineers, U. S. Army, will afford protection to an industrial district now engaged in war work, located north of the city, and some railroad lines, lumber yards and oil storage plants to the south.

The north project lies just below Wolf River, a tributary of the Mississippi. Its pumping station is located in Cypress Creek, which also serves as a reservoir for stormwater falling inside the levee during floods. The south project is adjacent to Nonconnah Creek. Its pumping station is served by a large open reservoir during flood stage of the Mississippi River.

Fig. 2. Concrete retaining walls with timber stop-log bulkhead will protect the levee line at low-lying railroad crossings.

Protects war industries

All levee work and the Nonconnah Creek pumping station were substantially completed before Pearl Harbor. Construction of the other pumping plant and installation of pumps and equipment in both stations were continued, however, since nearly all materials had been purchased, and positive flood-protection was deemed essential for the wartime industries within the levees. All pumps, motors and electrical equipment were installed by the Corps of Engineers, using hired labor. The pumping stations and levees were built by contract.

Two types of levee construction were employed. When the borrow pit was adjacent to the levee site, the fill was made by a cable and tower arrangement and by hauling equipment. A 12-cu. yd. bottomless bucket, attached to an endless cable operating between the two towers by an electric motor, deposited the earth fill in place. The empty bucket returned to the borrow pit by gravity since the head tower was considerably higher than the tail tower.

The south levee, adjacent to Non-

connah Creek, crosses two railroad lines which are from 15 to 20 ft. below the top of the levee. At these locations concrete revetment walls were installed, with provisions made for installing stop-log bulkheads during flood emergencies.

One levee section, 3,600 ft. long and 40 ft. high, next to the Cypress Creek pumping station was built as a dredged fill, since its borrow pit was a considerable distance from the levee site. It was built in three 1,200-ft. sections. Sand and silt were pumped in from across Wolf River through a dredge pipe completely encircling each section. Material was deposited in such a manner as to form a sealing core of silt and very fine clay along the centerline of levee. Width of core varied from 40 ft. at the bottom to 15 ft. at the top.

The completed levee has side slopes of 1 on 5 and 1 on 6½, a 24-ft. top width carrying a lightly graveled 10-ft. roadway for the convenience of the pumping station personnel. All levees provide a 3-ft. freeboard over those on the Arkansas side of the river. Levee slopes have been planted with Burmuda grass roots to prevent erosion.

Large pump capacity

The two pumping stations are of the same general design. The Cypress Creek station, measuring 46 ft. wide, 125 ft. long and 42 ft. high is of greater interest since it is the larger of the two. The enormous capacity of this plant assures prompt removal of all drainage water falling within the levee during floods. It has six 500 cfs. pumps for flood relief, operating under a 28-ft. head, and two 60 cfs. standby pumps for removal of small amounts of surface water during floods. The total capacity of the pumping plant is 2,050 mgd.

Also, there are three 2,000 gpm. sewage pumps to pump domestic sewage out into Cypress Creek during high water. During normal times the sewage in this area flows out into Wolf River, but during flood emergencies it will be diverted through the pumping station, passing through a screen basket before entering the pumps.

In other pumping stations to be constructed after the war it is planned to install sewage grinders in lieu of the screen basket. All sewage pumping facilities are sealed off from the rest of the plant to prevent damage to the main pumping equipment from harmful sewage gases. All pumps are centrifugal and are electrically operated. Each of the large flood-relief pumps is operated by a 2,000 hp. motor using 3-phase, 60-cycle current having an incoming power of 12,000 volts.

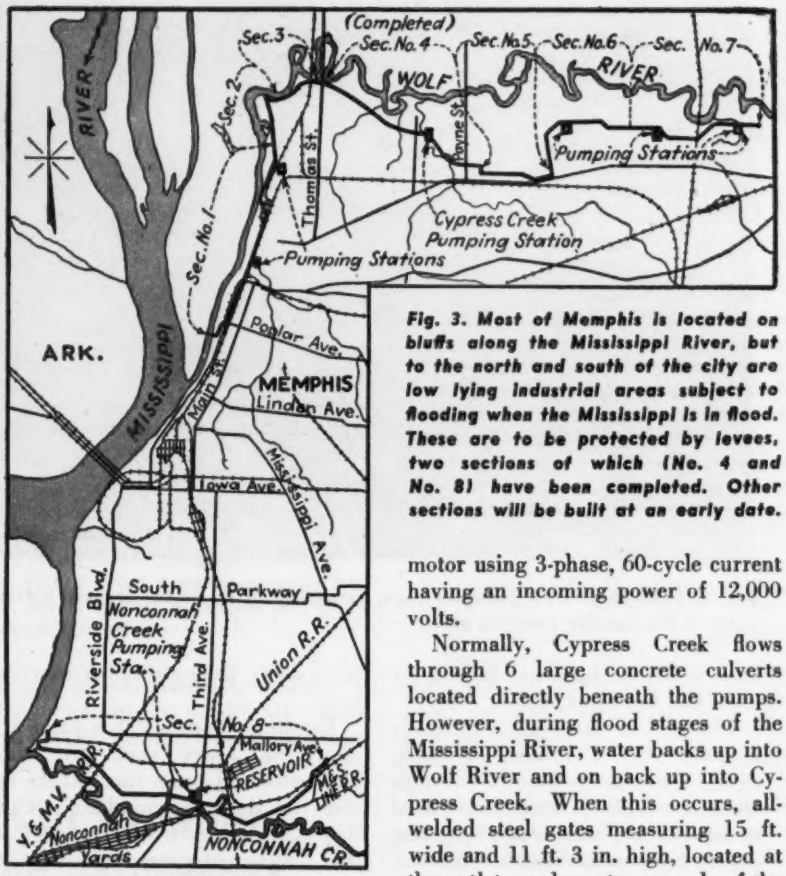


Fig. 3. Most of Memphis is located on bluffs along the Mississippi River, but to the north and south of the city are low lying industrial areas subject to flooding when the Mississippi is in flood. These are to be protected by levees, two sections of which (No. 4 and No. 8) have been completed. Other sections will be built at an early date.

Normally, Cypress Creek flows through 6 large concrete culverts located directly beneath the pumps. However, during flood stages of the Mississippi River, water backs up into Wolf River and on back up into Cypress Creek. When this occurs, all-welded steel gates measuring 15 ft. wide and 11 ft. 3 in. high, located at the outlet, or downstream ends of the 6 passing culverts will be lowered into place, with pressure from the flood-waters on the river side of the flood protection works causing the gates to seal against the pumping station walls. Any stormwater then falling on the drainage area protected by the

Fig. 4. Steel-beam wing and grouted riprap protect the approach channels to the Cypress Creek station. Substructure is concrete, heavily reinforced.

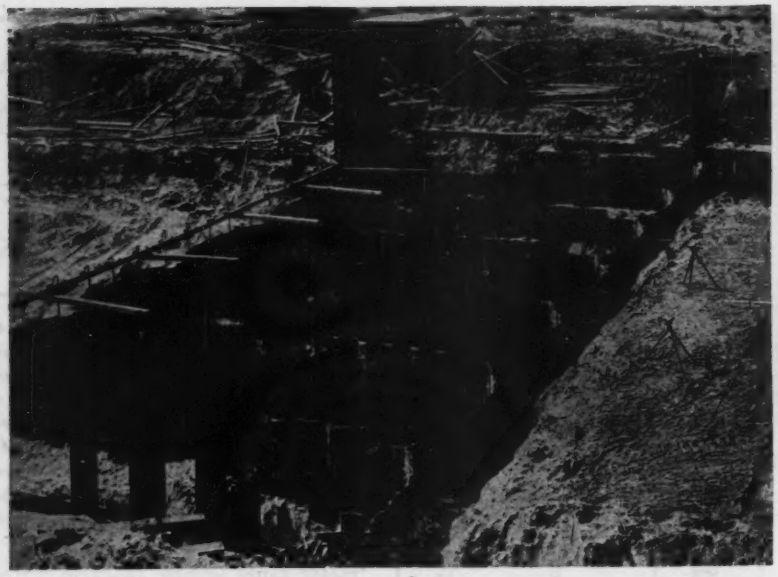


Fig. 5. Sand-filled, steel sheetpile cells, extending 20 ft. below channel bottom support the massive pumping plant.

levee will be pumped up and over the levee into Cypress Creek.

The culvert gates are electrically operated and they have full-rising stems. Vacuum breakers in the large discharge pipes prevent reversal of flow should any pump cease operating during high water outside the levee. This is a preventive measure to keep flood water from siphoning over the levee.

Discharge pipes for each pump are all-welded, heavy steel, reinforced with exterior T-beam ribs. At the intake end they are circular, 7 ft. in diameter. This section is transformed into a rectangular cross-section 11 ft. 8 in. wide by 4½-ft. high as the pipe goes over the levee and it then is flared to a 9 ft. square opening at the discharge end. Any trash accumulating at the intakes is picked up by specially designed trash rakes, operating on vertical endless chains, and deposited on the roadway for easy removal.

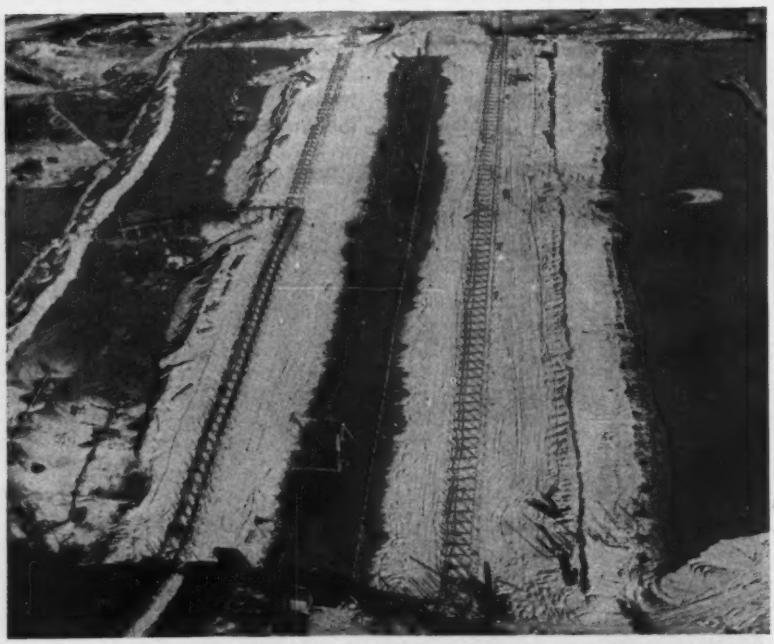


Fig. 6. Dredge-fill levees were built in 1,200-ft. sections, varying in height from 28 to 40 ft. and with side slopes of 1 on 5. Standpipes near each end drained excess water from the sealing core.

Sand-filled foundation cells

Foundation material under the Cypress Creek station was incapable of supporting the superimposed loads of the large pumps and motors. Consequently, sand-filled sheet piling cells were placed under each of the six large pumps. Each cell is 17½ ft. wide, 48 ft. long, and 20 ft. deep. The pumping plant substructure is reinforced concrete with retaining walls forming the outlet spillway and braced with concrete cross-beams.

Concrete-encased steel columns support steel roof trusses which, in turn, carry a cast-in-place concrete roof. Large interior concrete columns cast integrally with heavy concrete cross-beams carry heavily reinforced concrete floors supporting the massive pumps and motors. Floor slabs beneath the pump motors vary from 22½ to 40½ in. in thickness.

Exterior walls are concrete, faced outside and inside with brick. Interior wall finish of light tan glazed brick, glass-block windows with small clear-glass panes, white-painted concrete ceiling and ceramic floor tile, all lend a light and cheerful atmosphere to the pump room.

An independent emergency lighting system stands ready in the event of a failure in the main power line. A 20-ton, 43½-ft. span electric overhead crane operates over the full length of the motor room for emergency repair of the motors and pumps. It was used to install the heavy pumping equipment.

Dependable operation insured

Since the pumps will be operated only during floods, which fortunately occur at rare intervals, special precautions are taken to insure their being operable at all times and on short notice. The prime concern is to keep the motor coils dry during long inactive periods. This is done by automatic electric de-humidifiers intermittently forcing warm dry air into the space surrounding the motor coils, while at the same time withdrawing any accumulated moist air.

Fig. 7. Six 2,000 hp. electric motors in the Cypress Creek pumping station drive pumps having a total capacity of 3,000 cfs. as this great pumping capacity will be called into service only at time of high floods, special provisions had to be made to keep the motors in condition for quick service.

The Nonconnah Creek pumping station follows the same general design as the Cypress Creek plant, although it is considerably smaller. It has three 500 cfs. flood-relief pumps, two 60-cfs. standby pumps and three 2,000 gpm. sewage pumping units.

Contract for the substructure of the Cypress Creek Station was held by Ben M. Hogan, Little Rock, Ark. E. O. Korsmo built the superstructure. The Zeigler Construction Co., Nashville, Tenn. constructed the substructure of the Nonconnah Creek plant. H. J. Gilbertson & Co. was contractors for the superstructure. The pumps, motors and other operational equipment were installed by the Army engineers, using hired labor.

Engineering personnel

All construction has been under the direct supervision of the district engineer, Memphis Engineer District, reporting to Brig. Gen. Max C. Tyler, division engineer. The present district engineer is Lt. Col. Garner W. Miller. Until ordered to military duty, Major (now Colonel) Harry Meyer was project engineer with J. P. Pumphrey as office engineer. The installation of equipment at Cypress Creek has been under the direct field supervision of B. F. Williams.

Navy Engineers Cut Expenses By Reconditioning Equipment

The Bureau of Yards and Docks announces it has been able to reduce by nearly $226,000,000 its supplementary budget requests, due to various savings during 1943 in connection with construction, according to a report by Vice Admiral Ben Moreell, Civil Engineer Corps, USN, the bureau chief.

Part of the savings is attributed to the reconditioning of construction equipment at three repair depots established early in 1943 at Lonsdale, R. I., McAlester, Okla., and Vernon, Calif. Heavy construction equipment valued at approximately $8,000,000 has been rebuilt at these depots.

Upon arrival, it is inspected, recommendations are made as to its possible use, an estimate of cost of repair is made, and the equipment is then dismantled, cleaned, and reinspected. That to be consigned for shipment overseas to the Seabees who are operating at bases with limited repair facilities is rebuilt to the same standards demanded of new equipment, and, therefore, undergoes rigid inspection and testing. For such tests the equipment is taken to proving grounds where it is subjected to conditions simulating those at advance bases. Any necessary adjustments are then made before the equipment is painted and shipped overseas.

Machinery which will not withstand the demands at advance bases is shipped to bases in this country, while that not reusable is sold as scrap. The officer in charge of this work is Lieut. Com. L. C. Parks, Civil Engineer Corps, USNR. A resident officer in charge at each depot directs field operations.

Other savings of the bureau are credited to various things. One of these was the establishment a year ago of surplus material boards. During the year, equipment and materials were transferred to other Navy locations and to other government agencies in an amount of $100,026,610. An additional saving of $851,000 was made by purchasing used instead of new equipment which, Admiral Moreell's report says, was also available more promptly than new equipment.

Still other savings include $89,000,000 credited to eliminations, reduction in scope, substations, and changes in design, particularly since appointment of conservation officers at naval shore establishments. A $250,000 saving is attributed to railroad shipment reclassifications, such as reclassifying "wooden panels" as "flooring, native wood," which alone saved $100,000 in freight. Another saving resulted from salvaging by Seabees of $500,000 worth of equipment and material from wrecks along the coast.

Changes include redesign of pontoons to use 10 gage steel in lieu of $\frac{3}{16}$ in. plate with a saving of 14,000 tons of steel a year. In cooperation with the manufacturer, a light-weight, 7-cu. ft. concrete mixer was developed. A saving of 1,800 tons of steel was made at Hunters Point, Calif., when the officers in charge of construction there used precast concrete forms in lieu of steel for submerged forms in the construction of three graving docks.

Other miscellaneous facts brought out by the report are that the Bureau of Yards and Docks early in 1943 returned to its established policy of awarding contracts on a lump sum basis, and took steps to close out cost-plus-fixed-fee contracts wherever possible.

ENGINEERING ABROAD AS SEEN BY ENR EDITORS

Unloading Equipment on Hostile Shores

N. A. Bowers
Pacific Coast Editor, Engineering News-Record

***Contents in Brief**—Large size equipment essential to speedy construction of advanced bases is too heavy to be put ashore by prewar methods. Seabee battalions, with special stevedore training, are landing mobile equipment weighing up to 35 tons on beach heads close behind combat troops. The Bureau of Ships has provided new types of landing craft, of which LSTs and LCTs handle large construction equipment particularly well. About 25 percent of the Navy's ship construction funds for 1944 will be spent on landing craft. There are now 15 types of landing craft.*

UNLOADING OCEAN-BORNE FREIGHT at points where there are no shore facilities—and where there may even be enemy opposition—is not within the usual field of activity of construction forces. Hence no such work was contemplated when original plans were laid out for training naval construction battalions. However, after some lengthy delays when urgently needed ships waited many days to be unloaded, a special organization of Seabees was formed for stevedore duty.

The first step was to add to the curriculum at Seabee training camps a practical course that gives men thorough preparation for work as "special" or stevedore battalions unloading freight, including heavy construction equipment. Mock-up ships with dummy hatches and heavy, awkwardly shaped freight were included as a part of the training program. Handling this type of cargo was continued until the crews could work speedily and effectively in the dark using only such gear as they could bring with the cargo they came to unload.

In early stages of the war in the Pacific, delay in unloading ships was also occasioned by having to coordinate the unloading parties of too many branches of military service in the one operation of getting freight from transoceanic steamers into a depot on shore. Now this is being done under a unified command that is responsible for transfer from ship-to-barge or from landing craft-to-truck-to-depot. The Seabee "specials" supply winch drivers and hatch tenders, thus making possible 24 hr. continuity of the unloading operation. One stevedore "special" battalion can usually work four ships in a harbor and can keep as many more men busy on shore (under ordinary hauls) in transporting materials and equipment from piers or landing point to storage depot.

Fig. 1. Bulldozers prepare a beach landing point for an LST, similar to the one in the background, by hauling out a timber approach for landing trucks.

Special landing craft developed

Ships of the Liberty class now have a large capacity boom over one of the hatches and lesser capacity booms over others, thus permitting the stowage of heavy items in certain locations. But, Liberty ships do not land freight on beaches where the critical point in weight limitation often comes. Construction equipment desirable on advanced base work, notably the large crawler cranes and shovels, weigh as much as 35 tons. They can be taken apart if absolutely necessary to curtail maximum lifts, but valuable reassembly time is saved where such equipment can be "walked" ashore under its own power or towed ashore by lighter equipment.

No such freight handling problem as presented itself in previous wars. hat is, the requirement that such eavy loads be landed where there are wharves or other shore facilities is new problem. This is where the spe- al landing craft that the Bureau of hips has been developing are in- aluable. The LSTs and LCTs, which re particularly well suited to this ervice, can handle heavy, mobile quipment, allowing the units to roll irectly onto the shore where beach onditions are favorable, or onto arges where a lighterage method of anding is necessary.

The LST is a freight steamer 328 t. long with two decks connected by levators. The ingenious design of all his type of craft permits grounding he prow on a sandy beach, dropping ramp from the broad forward end f its lower deck, and thus allows mo- ile units within its spacious hold to oll quickly ashore in the dry.

Enemy action necessitates speed

It isn't all as simple as that, of ourse, but this is a fundamental of he landing craft idea that has worked o well in our Pacific operations and lsewhere. The LST has her engines ell astern to make the bow as light as ossible and even when heavily oaded has only a light draft at the ow. If a beach has a 10 percent rade and a soft bottom and if the approach has the necessary water depth, the unloading of the cargo is a simple operation.

Fig. 2. Bulldozers work in water more than 3 ft. deep. Note wave approaching at extreme left. Fan of tractor at left is already throwing water.

However, the Seabee "specials" are prepared for less favorable conditions. In forward areas they must work fast because in landings near the front enemy action may come at any time. The captain of an LST has to look to the safety of his craft; he will not be caught grounded on the beach in daylight—a "sitting duck"—if he can help it.

A typical instance was the arrival at a designated beach head in New Guinea of three LSTs at 3 a.m., each carrying 300 tons of construction equipment. The Seabees were told that they had three hours to unload—anything not off by that time would be taken away by the ships speeding out of the danger zone before daylight. (It may be noted that these ships were unloaded and away before the specified time.)

But, this 300 tons was a minimum loading, consistent with the methods that have to be used when darkness

Fig. 3. Equipment coming ashore under its own power from an LCM (landing craft mechanized).

and haste are factors in getting off the freight. Those same craft probably brought 2,100 tons when they crossed the Pacific on the way to the front. That heavier cargo was loaded with a crane boom alongside and was planned for unloading under the same conditions. Loading for the battle zones is a very different matter—the capacity here ranges from 300 to 700 tons—according to the type of freight handled and the skill used in arranging stowage.

Supplementing the LSTs

If it is decided in advance that the conditions are such that the LSTs cannot get to the proposed landing point, the next consideration is the LCT, a craft with a ramp in the prow, like the LST, but which has only one deck and requires less depth of water. It has an "open top" that makes it a convenient craft for receiving freight that has to be lowered overside from a freighter or a wharf. The LCT has a capacity of 125 to 150 tons, depending on the type of load and the conditions under which it is to land.

On both LST and LCT, freight goes aboard in the reverse order of the unloading schedule. The rule of "bulldozers ashore first" is almost invariably followed because they may be needed to scrape up an earth ramp to facilitate movement between ship and shore or, if not that, they should be available at the earliest possible moment for other work in the new area, such as clearing a space to put the freight, making roads, clearing camp sites, and other duties.

If the shore line is rough or if the water depth over a reef is very shallow, neither LSTs or LCTs will be able to reach the beach and reliance must be placed on the smaller LCMs, on barges and an amphibious craft. Amphibious jeeps, amphibious trucks or "ducks" and LCMs are then used extensively for the lesser loads and pontoon cell barges bring in the heavy items. Where the cell barges are used, (*ENR*, July 27, vol. p. 106) they are assembled in strings on the ship's deck before arrival at destination. Then it only remains to lower the strings overside and fasten them together while they float. For this operation the barge size is made to suit the needs and may range from the popular 50 ton barge, 3 cells wide by 7 long, to the 250 ton size of 6x18 cells. The landing craft ramps can be lowered onto these barges and mobile equipment rolls out onto them under its own power.

When freight comes ashore

The barge-to-shore problem is usually not difficult if bulldozers get ashore early to build out finger piers or otherwise smooth the way for the large mobile units. Generally a 3-ft. depth of water is about the maximum, allowing for a little wave wash, in which it is considered safe for a tractor or crawler crane to move ashore, particularly when under its ow power.

Strange as it seems, 10 to 20 pe cent of the cargo usually goes ashor in men's hands or on their backs. Th is particularly true with the fir freight to move, such as tools, lig equipment and supplies needed by t workers who stream shoreward soon as means are provided. The workers set up equipment and fac ties that pave the way for all the o erations to follow, including the ha dling of the heavy items in the car

Speed of unloading, despite t most effective planning and handli equipment, may be slowed by lack a place to put the freight or the i ability to move about in the bea area selected for the landing ope tion. It is to be remembered that t supplies and equipment shipped with each battalion may occupy 8 10 acres when speedily and loos dumped ashore.

One battalion, landing hastily the dark at a spot whose choice w based on inadequate informatio found itself in a swampy area. Wh daylight came and the LSTs had d parted, it developed that none of t large mobile equipment could tra under its own power in the soft ar where the landing had been mad Nor was it possible to remove t equipment from this spot until a fle of LCTs came in, took the heavy uni aboard and ferried them to a near rocky ridge whence they got inland t

U. S. Army Signal Corps pho

Fig. 4. Six-wheel seagoing trucks or "ducks" take 2½ ton loads through surf and out to sea or up steep grades ashor They can launch themselves from an LST's ramp and reenter by the same way for another load.

ir objective. This sort of error is made often but it illustrates a nger constantly faced.

The Seabee stevedores at first were signed merely to the unloading of ight, leaving it at the nearest spot ere they were able to set it on dry d. Later, in many locations the ecials" were undertaking both the loading and the delivery on shore whatever spot was selected in ad-nce as the distribution depot (usu-y called "dump").

Lighter craft and "ducks"

For light loads, valuable aids to the rger craft that also use the prow mp, are the LCMs. They are rela-ely light, and are small enough to loaded onto a Liberty type ship by big crane. However, as the war has progressed it has been found much ore convenient to ship LCMs in nocked down form, thus saving much f the cargo space otherwise required. ear the front they are welded up in sembly depots. At such a depot re-ntly visited at an Army outpost, a nall crew of welders was making use f several parallel assembly lines lead-g to a transfer table that delivered a marine railway. This depot was rning out nine LCMs per day and as ready to step up daily production twelve.

Operation of the LCMs and various her types of smaller craft at the ad-nced bases is in the hands of stand-rd landing craft units (SLCUs) rmed by the Navy for this express rpose. Amphibious craft, particu-rly jeeps and the seagoing truck that known as a "duck" are close allies f the landing craft already men-oned. The ducks roll along on land t rates up to 40 mph. and then go own any reasonably smooth surface f 10 percent grade into water where ey are driven by a propeller, never topping in the changeover from hore-to-sea methods of propulsion. he ducks, with a payload capacity of ½ tons, can launch themselves from he ramp of an LST anchored in deep ater, travel ashore to an unloading oint and then return to the ship here they climb back up the same amp. A continuous circuit by a fleet f ducks (should we say "flock"?) an keep cargo moving ashore at a rprising rate. Only one operator is equired on each unit and in case of elay due to mechanical trouble or damage to any unit, a replacement can be quickly put in without delaying the crews of workers at each end of the amphibious run.

Fig. 5. Beach sleds are sometimes used at the shoreline for receiving small-packaged freight. The sleds are then dragged inshore by tractors.

So successful have been the operations of the various new types of landing and amphibious craft that the Bureau of Ships recently announced that the present landing craft fleet of 20,000 units will be expanded to 80,000. In this expansion program about 25 percent of the Navy's ship construction funds for 1944 will be spent on landing craft of which there are about 15 distinct types. "The tremendous numbers and varieties of landing craft" said Rear Admiral Edward L. Cochran, U.S.N., Chief of the Bureau of Ships, "are required to cover the various conditions under which the war is being fought in different parts of the world—the majority of the different types were developed to meet the rapidly changing situations in World War II."

Fig. 6. The great speed sometimes necessary in unloading is facilitated by getting the ship in close to the beach and making a roadway to its ramp.

Precise Concrete Curves in Wind Tunnel

Contents in Brief—A wind tunnel for high-velocity testing was built of reinforced concrete to reduce vibration and improve operating conditions. Exceptional care was required in building the forms for the surfaces with compound curves where accuracy of the finish required was without precedent in mass concrete construction. Expansion joints and doors are of special design to withstand air pressures as high as 1,000 lb. per sq. ft.

A WIND TUNNEL recently dedicated by the Boeing Aircraft Co. at Seattle, Wash., (*ENR* May 4, 1944, vol. p. 644) included in its construction some marked advances in concrete formwork and precise finish of concrete surfaces which are, in their field, comparable with the forward-looking nature of the aero-dynamic research that the new laboratory is to carry on. Unusual formwork was required to bring the finished surfaces of the concrete of the throat approach to within less than $\frac{1}{16}$ in. of the designed dimension. The structure, dedicated to a famous Boeing test pilot, is known as the Edmund T. Allen Memorial Laboratory.

The wind tunnel occupies an area about 160 x 270 ft. Essentially, it is a continuous-return structure shaped like a large doughnut, laid on the flat side (Fig. 2). The air circuit is 450 ft. in length at its centerline. Between the 8 x 12-ft. test section and the first corner, in the direction of air travel, the tunnel increases in size to 20 ft. sq. and continues at this size to a short distance beyond the second corner, where it changes to 24 ft. in diameter, to accommodate the fan. In the next 100 ft. from this point, the cross section increases to 27 ft. 6 in. by 29 ft. 6 in., and from here onward, excepting at the air-interchanger, the size does not change until the bellmouth or approach to the test section is reached.

Ratio of the areas of the largest and smallest sections in the tunnel is 9 to 1. Thus, an air speed of 85 mph. in the large section produces a throat velocity of about 765 mph.

The air is forced to circulate by a 24-ft. dia. fan, which fills the tion of that diameter. This sec was located close to the second ner to facilitate a connection b reasonably short shaft between fan and driving motor, the l being located in a powerhouse outside the tunnel wall. This mo which can deliver 18,000 hp. periods as long as the test runs continue, turns (at 524 r.p.m.) a in. solid steel shaft 37 ft. long tending through the tunnel wa the fan hub.

The shaft at the fan is tied to tunnel walls by thirty pipe struts. the revolution of the fan has a dency to produce a rotation of wind stream in the tunnel, pres tion vanes are attached to each these struts. These vanes are m able to an angle of 35 deg., this justment being made at the fan tween tests. Under normal operat no particularly excessive vector ment is developed at the fan, due to a possibility of the fan sh ding a portion but not all of blades, the struts and the exter supporting concrete had to be signed to resist approximately 2 000 ft. lb.

At the four corners of the tunn 12-gage ingot iron vertical deflec vanes are set across the tunnel as further aid in keeping the air fl as streamlined as possible.

Air is continually changed

The air-interchanger, which is cated on the tunnel roof, continua takes out warm air and replaces with cool air from the outside. Sin it may be necessary at some futu time to change the contour of t air-interchanger the entire constru tion was made of wood.

At every "round trip" 11 perce of the air in the tunnel is replace which means that during high-spe operation the air is complete changed three times per minute. A a further aid in controlling the tem perature in the tunnel, the vanes the four corners are sprayed wi water, which is wasted. By these tw methods the temperature is mai

Fig. 1. These curves in the concrete surfaces approaching the 6 x 12-ft. wind tunnel throat were poured within 1/16-in. of the design dimensions.

ed at less than 120 deg. F.
t was believed that if the tunnel ld be built entirely in mass con- te this would avoid the vibration t otherwise might interfere with ooth flow of air and accurate pres- re determinations. A major diffi- ty with the concrete construction, was realized, would be in attaining accuracy of finish required. her aircraft companies, which had viously built wind tunnels, sug- ted that concrete construction uld be feasible only if the poured ncrete in the tunnel itself were ished to sizes larger than specified mensions, with the exact inside fin- being made with cement plaster. rtainly, it was pointed out, this actice would have to be followed the throat where the accuracy finish is of most importance and here the curves are compound.

Very accurate work required

Despite these warnings, plans were awn for a poured concrete struc- re with no plastered surfaces, and e forms were set to exact, finished mensions. Because of unavoidable lays, construction operations were t completed before wet weather in. This put the work under the sadvantage of soft foundations and e attendant danger of settlement; addition the forms could not be prevented from absorbing some moisture.

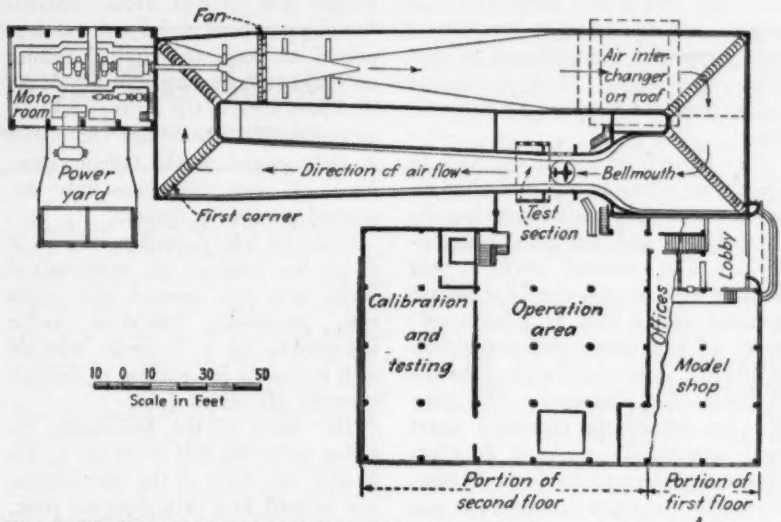


Fig . 2. Wind tunnel plan showing the wind circuit with respect to impelling force and throat or test section where measurements are made.

It was in the approach to the throat on which principal attention was centered. The original specification was that measurements in the throat should be accurate to within $\frac{1}{64}$ in. Although this was modified somewhat the methods of construction in the throat approach were such as to bring the finished surfaces of the concrete to within less than $\frac{1}{16}$ in. of the designed dimension at any point. In view of the conditions that had to be met during construction, this is considered to be a remarkably accurate job, if not a record for accuracy of cast-in-place concrete work. The poured concrete surface has been found to be sufficiently accurate without plaster finish of any kind.

For the greater part of the tunnel the faces of the inner form were made with water-resistant plywood. The surface of these forms against which concrete was to be poured was

g. 3. Formwork for 450-ft. wind tunnel had to be carefully built to meet 1/16-in. tolerances in bellmouth and 5/16-in. ewhere. The inner form for the bellmouth, which was constructed on end of metal lath and plaster, may be seen in ht background.

carefully waxed and shellacked, and every care was taken to see that it was supported and stiffened to prevent settling or other movement under the load imposed by wet concrete.

The inner form for the approach to the throat of the tunnel or bellmouth was constructed on end in one heavily braced piece and then tilted into position. The curved surface was formed with an asbestos fiber plaster selected with a view to a low coefficient of expansion and contraction (Mikolite, made by Union Asbestos & Rubber Co., Chicago). This plaster was spread on expanded metal well fastened to a wood backing. When the plaster had been finished to exactly the right curvatures it was allowed to harden and then was waxed and coated with shellac, as were the plywood forms used elsewhere in the tunnel, thus reducing to a minimum the moisture absorption from freshly poured concrete.

Placement of reinforcing in the throat was difficult because of the curved forms, but supports were arranged whereby part of the cage weight was carried from external framing overhead and a part was supported on concrete "chairs" resting on the bottom forms. Most of the steel bars were in the form of frames, or rectangular assemblies (in planes at right angles to the tunnel center line) of sizes that constantly decreased toward the throat.

Concrete was poured as dry as it could be obtained in ready-mixed form, and was worked into place with pneumatic vibrators under supervision of a foreman selected with a view to his success in difficult concrete placement jobs.

The floor of the bellmouth, together with the side walls up to the level of the floor of the test section, was poured first as a separate pour, the balance being poured in a second operation. Where there were rounded or flat fillets in transition from bottom to sides, they were made as part of the wall pour. The only cold joints were horizontal, except at expansion joints where a steel slip plate was used, designed to function under either vacuum or pressure (Fig. 5). This was necessary because, by virtue of the Venturi effect under the high velocities expected in the tunnel, parts of the circuit will be at times under inward pressures as high as 1,000 lb. per sq. ft. while at lower velocities there will be an outward pressure of 250 lb. per sq. ft. To take care of changes in the concrete due to an expected 70-deg. variation in temperature, the expansion joints were spaced not to exceed 75 ft., thus making it convenient to complete a wall section in one continuous pour.

An important factor in the successful surface finish obtained was the provision for the escape of entrapped air from the wall forms. The air was let out by ¼-in. holes bored through the forms on 9-in. centers both ways. Even on the most carefully finished surfaces these holes did not leave any mark on the concrete after the forms were removed. The supposition is that the holes in the wood filled up with material after they had fulfilled their function of providing means of escape for the air.

Some carborundum grinding was done on the finished surface, but chiefly at joints where minor ridges were left at form ends. In the critical throat-approach section, the fibre-plaster forms worked particularly well and left a surface finish of glossy smoothness.

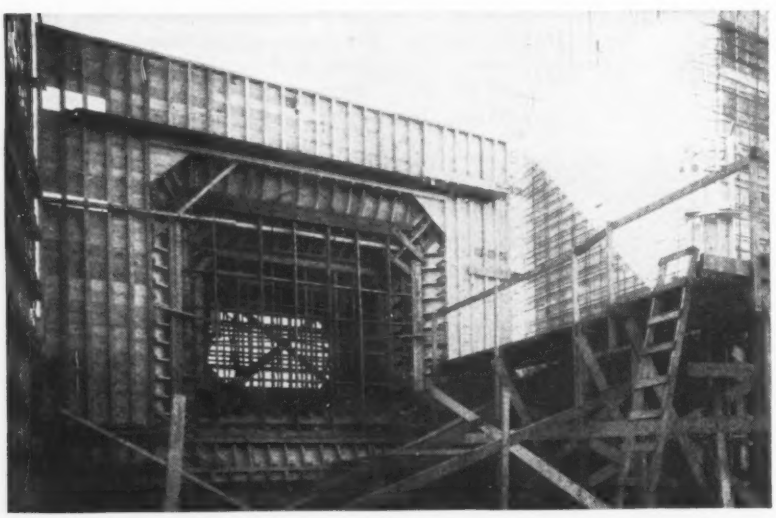


Fig. 4. Heavy bracing required for inner form of bellmouth, where 1/16-in. tolerances were specified, is shown by this view in direction of wind travel in completed tunnel.

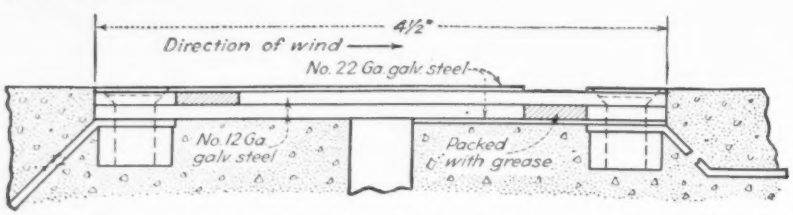


Fig. 5. Details of an expansion joint designed to function equally well under vacuum or pressure.

Doors of an unusual design

The doors, like the slip joints, had to be designed for pressures in both directions. They were built with a smooth inner surface and with double pivoted hinges to permit them to swing clear when opened. In general the doors were built of wood framed with steel. They were sealed with rubber gaskets and special locking devices to prevent chatter.

An aerodynamic laboratory adjoins the wind tunnel, with a reception lobby and model building shops on the first floor and engineering offices and a tunnel operations room on the second. This arrangement permits the models to be designed, built and tested in the same structure. The adjoining building was isolated from the wind tunnel by an expansion joint that extends through the floors, walls and roof.

The wind tunnel was built under contract awarded by the Boeing Aircraft Co. to The Austin Co., Richard Ellis, acting district manager, Seattle.

Book Notes and Reviews

The month's addition to the engineer's reading and reference list

Refresher Material

CALCULUS REFRESHER FOR TECHNICAL MEN—By A. A. Klaf. 431 pp. McGraw-Hill Book Co., New York 18, and London. $3.

BASIC MATHEMATICS FOR ENGINEERS—by Paul Q. Andres, Hugh J. Miser and Haim Reingold. 726 pp. John Wiley & Sons, New York; Chapman & Hall, London $4.

As the title indicates, the calculus book is for those whose knowledge of the subject has grown rusty. The author has approached the subject from the angle of the man who needs to rediscover how to use calculus in his everyday work.

The book on basic mathematics is an outgrowth of teaching the subject to members of the Signal Corps. It contains the mathematics required for elementaary engineering courses, covering algebra, trigonometry, analytic geometry and chapters introductory to differential and integral calculus. Explanations and discussions are made sufficiently complete for home study.

As the purpose of the book is to relate mathematics to engineering, the illustrative examples are taken largely from engineering. Stress is laid on accuracy in numerical computations.

Both books should prove useful to engineers who find it necessary to refresh their knowledge of mathematics or calculus in taking on a new war job or in the postwar readjustment period.

WPA Viewed Objectively

THE WPA AND FEDERAL RELIEF POLICY—By Donald S. Howard, 879 pp. Published by the Russell Sage Foundation. New York. $4.

Seven years of study of national relief policies went into the preparation of this exhaustive study. Before joining the Sage Foundation staff the author served as director of one of the area statistical offices of the Work Projects Administration, hence he saw that agency from the inside as well as from the outside.

All the many questions that were raised during the depression days about the WPA are discussed in detail, as are the general federal policies with respect to relief. As a matter of record and for the careful student of relief policies, this is desirable, but for the busy reader so much detail is a handicap. Even Part V of the book, the discussion of the "broader issues," in itself is a small book.

The two major federal policies discussed by the author are provision for undergirding a socially defensible standard of living below which no family in the nation should be permitted to fall, and provision of work for the unemployed. On the latter, the author states: "Having seen unemployment virtually eliminated as an incident to the pursuit of war, the people of the United States might well insist that planning for the future be done in such a way as to preclude the possibility of a return to mass unemployment."

The author believes that, despite its defects and handicaps, the WPA did a very creditable job.

Military Air Mapping

MILITARY MAPS AND AIR PHOTOGRAPHS—By A. K. Lobeck and W. J. Tellington. 256 pp. McGraw-Hill Book Co., New York 18, and London. $3.50.

About one-fourth of the book is devoted to the fundamentals and techniques used in military map reading, including such subjects as; scales, marginal information, military grid systems, azimuths and bearings, and map orientation in the field. Numerous problems (with answers) illustrate the principles presented.

Over one-half of the contents of the book concerns topographic forms and landscape types. The authors believe that a general understanding of these various *geomorphic* forms is valuable to the map maker in order that their topographic maps accurately portray the terrain. Also map users should have the same understanding in order to read or interpret a map thoroughly. For example, a person familiar with various landscape types can make a reasonable guess regarding the character of the soil or rocks in a certain region merely by studying a topographic map. Numerous sketches and contour maps illustrate the correct appearance of the various topographic forms. Certain basic geologic information has been included to enable the reader to obtain a greater appreciation of landscape types.

One section of the book concerns the interpretation of air photographs. Various aids used in identifying objects are described, such as; shapes, relative sizes, character of surroundings, tones or shades, and shadows. Some information is also included on stereoscopic examination and the use of strip or reconnaissance mosaics. The various phases of interpretation are illustrated.

The last part of the book is devoted to practical problems in the use of maps and air photographs. The reader will be impressed with the common-sense method of approach used throughout the book, and also with the many informative illustrations.—*Reviewed by* REYNOLD E. ASK, *Associate Photogrammetric Engineer, U. S. Coast Geodetic Survey, Washington, D. C.*

Controlling Motors

CONTROL OF ELECTRIC MOTORS—Second Edition. By P. B. Harwood. 479 pp. John Wiley & Sons, New York 16. $5.

For the construction man with some knowledge of electrical engineering, this book provides the fundamental knowledge he should have in deciding on the proper type of control for his motors. Also included is information on the principal types of motors and their characteristics.

Miscellaneous Notes on Booklets and Reprints

CONSTRUCTION OF CHICAGO'S FIRST SUBWAY is the subject of a group of papers published as Part 2 of the June, 1944, issue of the *Journal* of the Western Society of Engineers, 205 West Wacker Drive, Chicago 6, Ill. Price, 75c.

BALLAST SPECIFICATIONS are the subject of circulars 23 and 24 of the National Sand and Gravel Associa-

tion, Munsey Building, Washington 4, D.C. Circular 23 contains the specifications for prepared stone, slag and gravel ballast as adopted by the American Railway Engineering Association in March of this year. Circular 24 is a report of an A.R.E.A. subcommittee entitled "Review of Ballast Specifications of Leading Railroads to Determine Conformity with A.R.E.A. recommendations."

WATER CONSERVATION PLANS for the West Fork River basin in West Virginia are examined, and the broad philosophy of water uses expounded, in a brochure prepared by Scotland G. Highland, general manager and senior engineer of the Clarksburg (W. Va.) Water Board. Limited free distribution by the author.

REPRINTS OF ARTICLES in *Engineering News-Record* on the Alaska Highway and the Inter-American Highway are still available at 25c each, from the editorial department, 330 W. 42nd St., New York 18, N. Y.

WATERWORKS ACTIVITIES currently attracting attention in the United States, including a War Production Board appraisal on the future outlook and an analysis of postwar water supply projects, are discussed in an *Engineering News-Record* reprint titled "What's Ahead For Waterworks?" Copies are available for free distribution.

THE PROCEEDINGS of the first Illinois State Asphalt Conference, held in Springfield Feb. 23-24, have been published in a limited edition by the Asphalt Institute. Two of the principal papers are available for general distribution in reprint form. These are "Construction and Resurfacing of Primary Highways," and "Soil Bearing Tests and Flexible Pavement Design," both of which may be obtained from the Asphalt Institute, 801 Second Ave., New York 17, N. Y.

THE PRE-ENGINEERING INVENTORY, a paper by K. W. Vaughn, director of the Measurement and Guidance Project in Engineering Education established jointly by the Society for the Promotion of Engineering Education and the Engineers Council for Professional Development, has been reprinted from the *Journal of Engineering Education*. Copies may be obtained from F. L. Bishop, secretary, S.P.E.E., University of Pittsburgh, Pittsburgh, Pa.

RENEGOTIATION REGULATIONS of the War Price Contracts and Adjustment Board can be obtained from the Superintendent of Documents, Washington, D. C. for $2, which includes supplements to be issued monthly.

A "CONTRACTOR'S GUIDE" has been issued by the War Department as Pamphlet No. 34-2 to assist contractors in bringing about the final settlement of their contracts. In announcing the publication of this pamphlet, the American Road Builders Association states that unlike many government documents, it is clearly written. Copies may be obtained from the War Department, Washington 25, D. C.

MODULAR PLANNING as related to building design is the subject of Bulletin No. 46 of the Producers' Council, Inc., 815 15th St. N.W., Washington 5, D.C. This pamphlet has been issued by the council to encourage the use of modular planning in postwar construction.

A NOTICE concerning the "American Standard Building Code Requirements for Masonry," issued by the American Standards Association, published in the June 15 issue of *ENR*, neglected to state that these code requirements also can be obtained from the Superintendent of Documents, Washington 25, D.C., for 10c. They are contained in Miscellaneous Publication M174 of the National Bureau of Standards.

New Engineering Books

PUBLIC WORKS ENGINEERS' YEARBOOK, 1944—320 pp. American Public Works Association, Chicago 37. $3.75.

THE GEOGRAPHY OF WORLD AIR TRANSPORT—Vol. I of a series under the title America Faces the Air Age. By J. Parker Van Zandt. 67 pp. The Brookings Institution, Washington 6, D. C. $1.

SPEAK WELL—AND WIN—By William P. Sandford. 176 pp. McGraw-Hill Book Co., New York 18, and London. $2.

ELEMENTARY TOPOGRAPHY AND MAP READING—By Samuel L. Greitzer. 157 pp. McGraw-Hill Book Co., New York 18, and London. $1.60.

THE MUNICIPAL YEAR BOOK, 1944—646 pp. The International City Managers' Association, Chicago 37. $8.50.

THE OXY-ACETYLENE HANDBOOK—587 pp. The Linde Air Products Co., New York 17. $1.50.

PRODUCTION, JOBS AND TAXES—By Harold M. Groves. 116 pp. McGraw-Hill Book Co., New York 18, and London. $1.25.

CONTROL OF ELECTRIC MOTORS—Second Edition. By P. B. Harwood. 470 pp. John Wiley & Sons, Inc., New York. $5.

AIR CONDITIONING AND REFRIGERATION—By Burgess H. Jennings and Samuel R. Lewis. 517 pp. International Textbook Co., Scranton, Pa. $4.50.

ENGINEERING DRAWING SHEETS, SERIES E—By Thomas E. French and H. M. McCully. McGraw-Hill Book Co., Inc., New York 18, and London. $2.50.

Reports and Pamphlets

FEDERAL AID FOR POSTWAR HIGHWAY CONSTRUCTION—Statement of Charles M. Upham before the Committee on Roads House of Representatives, 78th Congress, 2nd Session on HR 2426. American Road Builders Assn., Washington 4, D. C.

THE ENGINEER IN THE POSTWAR WORLD—Speeches and addresses delivered at the Public Conference held in New York City on March 4, 1944. Research Bureau for Post-War Economics, 90 Morningside Drive, New York 27.

CODE OF MINIMUM STANDARDS—Constitution and By-Laws of the National Council of Technical Schools. Washington 6, D. C.

ETUDE EXPERIMENTALE ET THEORIQUE DE LA REPARTITION DES TENSIONS DANS LES POUTRES ENCASTREES—By Marcel Robert. Ag. Gebr. Leemann & Co., Zurich, Switzerland.

FIRST AND SECOND ANNUAL REPORT OF OPERATIONS UNDER THE BOULDER CANYON PROJECT ADJUSTMENT ACT—U. S. Department of the Interior, Washington, D. C.

MODERN METHODS OF INVESTIGATING ALLEDGED DAMAGE FROM BLASTING—By L. Don Leet. National Crushed Stone Association, Washington 9, D. C.

PUBLIC WORKS AND THE NATIONAL WELFARE—By Harold D. Smith. American Road Builders' Association, Washington 4, D.C.

AGGREGATES FOR CONCRETE—By C. E. Wuerpel. Circular No. 25, National Sand and Gravel Association, Washington 4, D. C.

FATIGUE STRENGTH OF FILLET-WELD AND PLUG-WELD CONNECTIONS IN STEEL STRUCTURAL MEMBERS—Engineering Experiment Station, University of Illinois Bulletin, Urbana. $1.

TENTH PROGRESS REPORT OF THE JOINT INVESTIGATION OF FISSURES IN RAILROAD RAILS—Engineering Experiment Station, University of Illinois, Urbana. 15c.

(*Continued on page* 178)

THE NATIONAL DEBT—
and Your Postwar Job

Coming upon the heels of a ruinous ten-year depression, this war has once more made it clear to us that the strength of our country depends upon our ability and willingness to produce. Until the world conflict eclipsed the depression, we saw what failure to use our productive capacity can do—even to a country potentially as rich as ours.

The stark reality of war finally shocked us out of our economic lethargy. The necessity of supplying our Armed Forces with almost unlimited quantities of goods unleashed our inventive genius and revealed to us our real capacity to produce. It indicated what our standard of living might be if, in time of peace, we used our full productive capacity.

Today we are producing more than all the other nations combined, half again as much as in 1940. Today our production is insuring victory to our fighting men.

But what of the future?

Already our national debt has reached astronomical proportions, and it is going higher. The depression years' fear of insecurity that all but paralyzed our spirit of enterprise, our inventive genius, and our natural instinct for expansion, appears likely to return promptly if industrial activity again is curtailed for long because of unwise public policies.

This war is being fought to make men free. But our economy cannot be kept free through military conquest alone. There is another responsibility which we on the home front cannot avoid any more than we can build walls around our future. That is the problem created by our frightening public debt.

This is a two hundred billion dollar war. It affects the lives of every one of us. At the end of this war, the public debt of the United States will be at least ten times the twenty-five billion dollars that it was at the end of the first World War. It will be almost twice the present annual national income of the country. The interest charge alone will be about 4 per cent of the national income. If the burden were spread evenly, interest alone would take at least $80.00 of every worker's income per year, or approximately $1.60 out of each and every weekly pay check.

Some people fear that the heavy taxes required by the debt will keep the country poor by obstructing employment and limiting the output of goods.

Others believe that the size of the debt does not matter because we owe it to ourselves. They reason that if A is taxed $100 to pay $100 interest to B, A has $100 less to spend and B has $100 more, but both together have the same amount. They, therefore, hold that the demand for goods and the volume of employment remain unchanged.

Which view is correct?

Is our huge debt bound to be a crushing burden which limits employment and lowers the nation's standard of living, or will it simply redistribute income? May the public debt under certain conditions even be used to help increase employment and raise our living standards?

Most people, rich and poor alike, find it difficult to believe that the national debt "just doesn't matter". They know that the interest alone on this huge debt will be almost equal to the total amount of taxes ever raised before by the government for all purposes in any peacetime year. They find it difficult to follow the kind of reasoning that suggests increasing the already mammoth debt year by year in order to maintain full production and employment. They fail to see how this "debt raising" can go on indefinitely.

On the other hand, the records show that other nations have more than once successfully managed even greater debt burdens than will confront the United States after the present war. The interest on the British debt after the Napoleonic Wars was nearly 8 per cent of the national income, and after the first World War was over 7 per cent. But despite heavy taxes and some unfortunate mistakes in economic policy (such as restoring the prewar pound), per capita real income in Great Britain rose about 31 per cent between 1920 and 1929. In fact, it rose as rapidly as it did in the United States. The world depression was far less severe in Britain than it was in the United States; and, by 1936, when industrial production still was 6 per cent below 1929 in the United States, it was nearly 16 per cent above 1929 in Britain. Britain's heavy debt burden proved less of a handicap to her during the depression than our weak banking system did to us.

Whether the debt becomes a crushing burden or whether we use it to further our progress depends upon who holds the debt and how the money is raised to pay the interest.

Here are the important possibilities:

1. If the expenses of the government, including the interest on the debt, are met largely by heavy taxes upon business profits—i.e., by taxes upon job-giving—then they will reduce employment, output, and our standard of living, regardless of who holds the debt. Heavy taxes on profits prevent enterprise from expanding current operations or enlarging the capacity of its plants, unless the prospects for profit seem certain and the prospects for loss are slim. Hence the jobs that might be created to take advantage of long chances will not come into existence, and the country as a whole will be poorer.
2. If the expenses of the government are met largely by stiff surtaxes upon the incomes of persons who do a considerable amount of saving, and the debt is, in the main, owned by millions of small investors, then the net effect of the debt upon the volume of employment and output will be fairly neutral. The stiff surtaxes, while reducing the savings of the well-to-do, will cause them to avoid risky investments and to hold part of the savings of each year in the form of cash. This will limit the demand for goods and the volume of employment. But this effect will be partially offset if millions of small holders of the debt are led by their savings in government bonds to spend a larger part of their current income.
3. If the expenses of the government are met largely by sales taxes or other taxes on small incomes, and if the debt is held largely by the well-to-do or by business corporations, then the effect of the debt will be unfavorable to employment and production. The limitation to the spending power of the small-income group will reduce the volume of investment opportunities, and the transfer of income to the well-to-do will increase the volume of investment-seeking funds.
4. If the debt is widely distributed among millions of small holders, and the expenses of the government are met largely by taxes on individuals, if substantial exemptions from surtaxes are given for all income invested in new plant or equipment, and if there are liberal offsets for losses, then the debt will help increase employment and raise the standard of living. The millions of small holders will gain a sense of security from their accumulated savings and hence be encouraged to spend a larger portion of their current incomes. The stiff surtaxes will reduce the savings of the well-to-do; liberal exemptions for income put into new plant and equipment, and generous treatment of losses, will cause the well-to-do to invest their savings in job-giving enterprise rather than to hold them in idle cash.

But what is the situation today?

Today, non-banking corporations own nearly half of the Federal debt, commercial banks about one-fourth, and individuals less than one-fourth. Not more, and probably less, than one-tenth of the debt is held by persons earning less than $5,000—although these persons receive three-fourths of all income.

Today, about half of the revenues of the Federal government come largely from taxes which must be regarded as ***taxes upon the creation of new jobs.*** If these conditions continue, we may be sure that the debt will be a disastrous obstacle to a rising standard of living after the war.

What can be done to change this situation?

To begin with, vigorous steps should be taken to get much more of the debt into the hands of individuals, particularly of those in the small-income group. During the last three years, the incomes of individuals, after taxes, have exceeded the supply of consumer goods by $74.2 billion. In other words, individuals have been compelled, by the sheer scarcity of goods, to save over $74 billion. Of this amount, only $27.4 billion, or 37 cents out of every dollar, has gone into government bonds. Indeed, individuals have saved more in the form of cash and bank deposits than in the form of government bonds. The sale of war bonds to individuals was most disappointing in the recent drive. It was so disappointing, in fact, that I would favor a special drive ***for individuals only,*** to be scheduled before the next general drive. During 1944, when the supplies of civilian goods are severely restricted and when the fighting is at its climax, the Treasury will have its best opportunity to persuade individuals to buy more bonds. This opportunity should not be lost. An increase of at least twenty-five billion should be the goal for the next year. Every citizen should be made to understand that by buying war bonds now, he is not only helping to win the war; he is helping to make possible a more prosperous and stable America after the war.

The efforts to sell bonds to individuals should be vigorously continued throughout the shift from war production to civilian production. During this period, corporations which, up to now, have been the largest buyers of government bonds, will need all their depreciation allowances and undistributed profits to pay for new equipment, and to restore their own dealers' inventories. The government, however, will still have large bills to settle and will need to sell as many bonds as it can for some months after the end of hostilities. During this period, the demand for most types of goods is likely to exceed the immediate productive capacity of industry. Hence, the sale of bonds by the government will make for economic stability.

The huge expenses, including interest on the debt, which the government must meet after the war, require that the tax system be drastically reformed. Today, taxes fall most heavily upon those incomes which are the reward for increasing production and employment, because profits are taxed first as corporate profits, and taxed again as dividends to owners of the corporation. Surtaxes are so stiff and offsets for losses so meager that the well-to-do capitalists cannot afford to encourage and help promising young businessmen to start new enterprises.

A nation whose expenses are as large as those of the United States will be after the war must be sure that its tax system provides incentives, not penalties, for increasing production and employment.

Should the debt be repaid? Some people fear that any reduction of the debt would have a deflationary effect and cause unemployment. An opposite view was expressed by Mr. Morgenthau recently: "We have a big public debt that must be paid off, and the quicker we do that the better." Both of these views are extreme. Repayment of part of the debt during a period of depression would increase unemployment. Every period of high prosperity, however, would give the government an opportunity to pay off part of the debt without limiting employment. During these periods of prosperity, business corporations will sell government bonds in order to buy equipment; and many individuals will redeem war savings bonds in order to purchase houses, automobiles, and other goods. If the government budget runs a surplus during periods of high prosperity, and if this surplus is used to retire some of the bonds sold by corporations or redeemed by individuals, the country will be protected against a disorderly and speculative rise in prices. Thus, reduction of the debt can be made a device for stabilizing our economy.

There are two other reasons why reduction of the debt will be desirable.

In the first place, it will help prepare the country financially for a possible third World War. Determined as we are that this war shall be the last one, common sense tells us not to count on this. At any rate, we must be prepared for any eventuality.

In the second place, gradual reduction of the debt would stimulate employment by creating the expectation of lower taxes. It is not generally appreciated how much the willingness of individuals and business concerns to spend money is affected by the prospects of higher or lower taxes. One of the best ways to make individuals and enterprises spend more freely is to convince them that taxes will become a little lower, year by year.

Many people have difficulty in visualizing the day when there will be a substantial reduction in the burden of the national debt. And yet, if the country pursues wise economic policies, there is no reason why the debt burden should not be cut in half during the next generation.

The days of technological progress and economic expansion are not over. They are, in fact, only well begun. During the Twenties, the national income in dollars of constant purchasing power increased by well over 50 per cent. Between 1929 and 1939, it increased by less than 6 per cent. Perhaps the rate of the Twenties cannot be maintained indefinitely; but scientific research and development work in industry are laying the foundation for very large advances in national income. Suppose that the national income increases 33 per cent in the first decade after fighting stops (say, hopefully, 1945), 25 per cent in the next decade, and thereafter at the rate of 20 per cent a decade. In 1955, the national income (at present prices) would be about $173 billion; in 1965, about $216 billion; and in 1975, about $257 billion. By 1970, the burden of the debt would be reduced by nearly half, even if not a ce of it were repaid!

A huge public debt is a test of the cha acter, the common sense, the foresight, a the equally important technical and en neering skill of a nation. *It requires th tens of millions of small incom earners be willing to become su stantial holders of the debt. It r quires that the nation be willing tax itself heavily, but in ways whi increase the attractiveness of jo giving or self-employment relative job-holding; it requires that the n tion be willing to pursue policies expansion and to put a rising incom for the nation ahead of the pleas self-seeking groups in labor, ag culture, and industry.*

A huge debt may so draw out the hidd powers of a people that it makes the nati wealthier rather than poorer, stronger rath than weaker.

Up to now, Americans have not met t test of a big public debt too well. Individua have saved more in cash than in governme bonds, and the country has shown little i terest in avoiding the kind of taxes that r duce the demand for labor. These sho comings, I am sure, stem largely from t fact that the American people never ha had the problems of debt and taxation ho estly and adequately explained to them.

I have confidence in the American peopl I believe that Americans have the intel gence to understand this problem of t public debt, the character to face their r sponsibility regarding it, and the commo sense to accept the challenge and make t most of it.

James H. McGraw, Jr.

President, McGraw-Hill Publishing Company, In

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CONTRACT UNIT PRICES

What contractors are bidding on different kinds of construction work

LABORATORY BUILDING LANGLEY FIELD, VIRGINIA

OWNER: National Advisory Committee for Aeronautics, Washington, D. C.

PROJECT: Construction of reinforced concrete electric aircraft instrument laboratory at Langley Field, Va., for the NACA. Building to be T-shaped; 217 by 250 ft.; three stories; rear portion 120 by 65 ft.

CONDITIONS: Contractor to furnish all materials and complete work in 152 days. Rail, highway and water transportation facilities available. Building concrete and unskilled laborers will be used to a large extent on this project, both at the rate of 65c. per hour.

BIDS: Four bids were received March 28, 1944 ranging from the contract low of $504,367 to $653,315. An analysis of the low bid is tabulated below.

LIST OF BIDDERS:

1. F. D. Rich & Co., Inc., New York, N. Y. (contract) $504,367
2. Doyle & Russell, Richmond, Va. 611,827
3. Virginia Engineering Co., Inc., Newport News, Va. 641,200
4. Grannis, Thompson, Street, Wattinger Co., Richmond, Va. 653,315

ANALYSIS OF LOW BID PRICE

Trade	Mat'l. Price	Labor Price	Total
1. General conditions	$1,885	$8,000	$9,885
2. Excavation (4,950 c. y.)		8,910	8,910
3. Piling	19,200	7,255	26,455
4. Concrete (4,300 c. y.)	65,500	52,500	118,000
5. Reinforcing steel	13,527	5,200	18,727
6. Masonry, stone and brick	12,100	13,165	25,265
7. Masonry block (11,000 c. f.)	9,300	10,100	19,400
8. Misc. iron and steel	4,000	300	4,300
9. Kalamein work	200	98	298
10. Roofing and sheet metal work	3,500	3,587	7,087
11. Lathing and plaster	1,500	1,567	3,067
12. Carpentry	16,585	10,000	26,585
13. Caulking	77	240	317
14. Waterproofing	1,526	2,300	3,826
15. Screening	1,300	286	1,586
16. Weather-stripping	566	700	1,266
17. Hardware	2,100	304	2,404
18. Painting	1,500	3,500	5,000
19. Shades	700	57	757
20. Tile and terrazzo	600	600	1,200
21. Slate	550	150	700
22. Marble	4,700	500	5,200
23. Acoustical work	4,950	4,000	8,950
24. Plumbing	26,000	14,500	40,500
25. Heating and ventilating	62,000	31,100	93,100
26. Electrical work	38,200	26,732	64,932
27 Monorail hoist	950	100	950
28. Elevator	5,000	700	5,700
	$297,916	$206,451	$504,367

FERRY TERMINAL, MARYLAND

OWNER: Maryland State Roads Commission, Baltimore; W. C. Hopkins, bridge engineer.

PROJECT: Reconstruction of Claiborne Ferry Terminal on Eastern Bay, at Claiborne, Talbot County, Md. Includes construction of timber bulkhead approximately 115-ft. long, ferry slip approximately 68 by 130 ft., and transfer bridge and buffer bridge. Roadway to be 10-ft. clear. Alternates were allowed for treated or untreated timber on the project. Award made on basis of treated timber and unit prices shown below are on that basis.

CONDITIONS: Contractor to furnish all material except about 40 pieces of timber sheeting for bulkhead behind buffer bridge which will be furnished by the State Roads Commission. Time for completion is 100 days. Highway and water transportation facilities available. Minimum wage rates specified are: skilled labor, 65c per hour; semi-skilled, 50c; and common, 35c.

BIDS: Three bids were received May 16, 1944, ranging from the contract low of $39,451 to $88,290.

LIST OF BIDDERS:

1. State Foundation Co., Halethorpe, Md. (Contract) $39,451
2. Whiting-Turner Cont'g. Co., Baltimore, Md. 64,453
3. Empire Constr. Co., Baltimore, Md. 88,290

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Class 1 excavation	25 c. y.	$1.00	$5.00	$3.50
2. Borrow excavation	1,200 c. y.	1.50	1.80	2.50
3. Remove existing coal wharf	Lump Sum	3,000.00	8,067.00	17,500.00
4. Remove existing traffic wharf	Lump Sum	300.00	3,525.00	1,500.00
5. Remove existing canopy	Lump Sum	250.00	200.00	1,000.00
6. Remove exist. transfer bridge	Lump Sum	100.00	100.00	700.00
7. Remove existing gallows frame	Lump Sum	100.00	150.00	350.00
8. Remove exist. rack and dolphins	Lump Sum	800.00	4,356.00	6,000.00
9. Reset exist. operating equipt.	Lump Sum	150.00	300.00	400.00
10. Treated Class A timber piles	10,300 l. f.	1.95	2.90	2.75
11. Test piles	50 l. f.	6.00	3.50	3.50
12. Fabricated structural steel	Lump Sum	1,600.00	1,401.00	1,600.00
13. Treated timber	30 M bm.	248.00	344.00	625.00
14. Untreated timber	7 M bm.	228.00	208.00	525.00
15. Reset salvaged lumber	2.3 M bm.	150.00	145.00	475.00
16. Transfer and drive 6-in. timber sheet	Lump Sum	1,000.00	864.00	1,500.00
17. Oyster shell riprap	5,000 c. b.	.10	.25	.50
18. Guard fence posts	20 ea.	3.00	5.00	6.75

SEWER RELEASE MAIN CALIFORNIA

OWNER: Stege Sanitary District, El Cerrito, Calif.; F. K. Hussey, district engineer.

PROJECT: Construction of sewer release main in Fairmont and Central Avenues to Richmond Annex, Calif. Includes construction of field office; furnishing and installing vitrified clay and reinforced concrete pipe; concrete jackets and pipe cradles; and concrete covers and rims for manholes.

CONDITIONS: Contractor to furnish all materials and complete work in 120 days. Highway transportation facilities available to site of work. Wage rates are: skilled labor, $1.50 to $2.00 per hour; semi-skilled, $1.00 to $1.40; and common, $1.00.

BIDS: Six bids were received in March, 1944, ranging from the contract low of $102,397 to $147,883.

LIST OF BIDDERS:

1. Stolte, Inc., Oakland, Calif. (contract) $102,397
2. John Pestana, Oakland, Calif. 112,936
3. M. J. McGuire and M. Hester, Oakland, Calif 119,544
4. R. Goold & Son, Stockton, Calif 122,548
5. Oakland Sewer Constr. Co., Oakland, Calif 127,539
6. M. J. Lynch, San Francisco, Calif 147,883

Item	Quan.	Unit Prices (1)	(2)	(3)
1. Field office	Lump Sum	$350.00	$350.00	$300.00
2. 15-in. vitrified clay pipe	360 l. f.	8.10	8.75	4.00
3. 24-in. vitrified clay pipe	2,486 l. f.	16.00	12.25	15.00
4. 24-in. conc. pipe (rein. with double circular cages, 10.25 lbs. of steel per ft., 3000-D)	142 l. f.	30.00	32.00	30.00
5. 36-in. vitrified clay sewer pipe	2,373 l. f.	17.15	23.25	23.00
6. 36-in. conc. pipe (rein. with double circular cages, 24.6 lbs. of steel per ft., 3000-D)	70 l. f.	48.50	45.00	40.00
7. Class B conc. jacket on 24 and 36-in. pipe	433.4 l. f.	11.20	23.00	30.00
8. Reinforced conc. cover and unreinforced rim for manholes	25 ea.	220.00	200.00	175.00
9. Class B conc. cradles under sewer pipe	50 c. y.	13.00	23.00	30.00

GEMMER STEERING GEARS

Simple Design—extreme sturdiness—use of anti-friction bearings at all critical points —make adjustments and servicing almost non-existent in Gemmer Steering Gears.

The life of the Gear is the life of the vehicle—steering is easy—remains easy.

Additional oustanding features of Gemmer Steering are:

Gear Teeth That Roll—No sliding contacts between gear teeth. The hourglass worm bears on *teeth that roll*, providing highest efficiency—smooth easy transfer of power.

Stability—Inherent design banishes "lost motion" and reduces wear to the least possible minimum. Steering is always firm, responsive, positive, with absence of rubbery feeling or wander.

Gemmer Steering has demonstrated its worth in all types of peacetime and wartime automotive vehicles from lightest passenger cars to heaviest buses, trucks, roadbuilding machinery, agricultural tractors—is doing an equally satisfactory job on a wide variety of vehicles and small boats for our armed forces.

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MANUFACTURING COMPANY
6400 MT. ELLIOTT AVE.
DETROIT 11, MICH.

GEMMER . . . Pioneer of High Efficiency Steering

MATERIALS AND LABOR PRICES

Market quotations on construction materials and wage rates reported monthly by ENR correspondents

CONSTRUCTION MATERIAL prices and labor rates for August show only minor changes from the preceding month, according to reports from twenty cities to *ENR*. Cement is 20c. per barrel higher in Philadelphia and ready-mixed concrete is up as a result of the cement price rise.

Boston prices for spruce and Douglas fir are up on 1-in. sizes, and in Philadelphia prices for short-leaf yellow pine and Douglas fir are higher.

With the exception of a 15c. per 100-lb. decrease in Philadelphia, structural steel shapes and reinforcing bars are unchanged from last month in the U. S. cit Structural shapes are 5c per 100-lb lower in Montreal. Vitrified sewer p increased on 8, 12 and 24-in. sizes in Philadelphia.

Common labor rates for building work and for heavy construction remain at l levels. The only change reported in skilled labor rates is for bricklayers Cincinnati. This rate increased 5c. per hour from the $1.825 previously repo by *Engineering News-Record*.

CEMENT, AGGREGATE, READY-MIXED CONCRETE—F.O.B. CITY

	PORTLAND CEMENT — Per bbl., C/L lots, incl. 40c. per bbl. for bags, cash dis. not deducted			SAND AND GRAVEL — Per ton, carload lots			CRUSHED STONE Per ton, carload lots		CRUSHED SLAG Per ton, carload lots, f.o.b. plant		CONCRETE BLOCK 8x8x16-in.; truckload del.; per block		CONCRE
	Cloth *a*	Paper	Bulk	Gravel, 1½ in.	Gravel, ¾ in.	Sand	1½ in.	¾ in.	1½ in.	¾ in.	Sand-grav.	Lt.wgt. Agg.	Ready M 1:2:4, o
Atlanta	$2.77	$2.52	$2.47	$1.79	$1.89	$1.99	$1.79	$1.89	$1.59	$1.69	$0.17	....	$8.01
Baltimore	2.53	2.28	2.03	1.75‡	1.75‡	1.25‡	1.75‡	1.75‡	1.75‡	1.75‡	.125	$0.125*w*	7.31
Birmingham	2.50	2.25	2.10	1.75	1.75	1.50	.85	1.00	.90	1.15	.1425	....	5.87
Boston	2.97*b*	2.72*b*	2.52	1.50‡	1.50‡	1.05‡	1.25‡	1.35‡	....	....	.13	.155*w*	7.55
Chicago	2.70	2.45	2.30	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	2.15‡*d*	1.75‡	1.75‡	.16	.16*x*	....
Cincinnati	2.31	2.06	1.81	1.20	1.20*dd*	1.10*dd*	1.80	2.80	....	....	.12	.15*w*	6.60
Cleveland	2.39	2.14	....	1.75*i*	1.75*i*	1.55*i*	1.80*i*	1.80*i*	1.73*i*	1.73*i*	.14	.15	7.30
Dallas	2.52	2.27	2.07	1.50*p*	1.70*p*	1.10*p*	1.69*p*	1.79*p*	....	....	.15	....	6.29
Denver	3.08	2.88	2.32	1.20	1.30	1.25	1.65	1.75	1.00	1.00	.15	....	7.25
Detroit	2.39	2.14	1.99	1.50	1.50	1.50	2.25	2.25	2.00‡	2.00‡	.13	.14*w*	7.00
Kansas City	2.58	2.33	2.18	1.85	2.30	1.00	1.91	1.91	....	....	.125	.125*ww*	7.50
Los Angeles	3.00*v*	2.40*v*	....	1.30	1.30	1.15	1.30*f*	1.30*f*	....	....	.04*bb*	.10*aa*	7.25
Minneapolis	2.90	2.65	....	1.00*h*	1.00*h*	.25*h*	1.00*h*	1.00*h*	....	....	.12	.16	7.10
Montreal	....	1.95*ra*	1.79*ra*	1.65‡*s*	1.65‡*s*	1.50*t*	.80*ct*	.90*ct*	....	....	.14*t*	.14*wt*	7.90
New Orleans	2.41	2.16	1.96	1.65	1.65	.90	....	....	....	....	.19	....	9.25
New York	2.89‡	2.64‡	....	1.60*de*	1.60*de*	.90*de*	1.70*de*	1.80*de*	....	....	.16	.14*vcc*	7.75
Philadelphia	2.73	2.48	2.28	1.55‡	1.65‡	1.20‡	1.90	1.95	1.10	1.10	.155	.155*x*	8.45
Pittsburgh	2.45	2.20	2.00	1.65‡	1.65‡	1.85*dd*‡	2.25‡	2.25‡	1.50	1.50	.17	.17*z*	8.25
St. Louis	2.80	2.52	....	1.75‡	1.75‡	1.25/1.50‡	1.10*h*	1.10*h*	.75*g*	.75*g*	.13	.11*w*	8.00
San Francisco	....*u*	2.21	1.91	1.36	1.36	1.36	1.46	1.46	....	....	....	.20*y*	7.55
Seattle	2.95*o*	2.75*o*	....	1.00*o*	1.00*o*	1.00*o*	2.00*o*	2.00*o*	....	....	.16	.16*j*	7.25

‡ Delivered. *a* 10c. allowed for each returnable bag. *b* 10c. per bbl. off for cash. *c* F.o.b. quarry. *d* Per cu. yd. *e* Barge lots alongside docks. *f* Crushed granite. *g* F.o.b. Granite City, Ill. *h* F.o.b. plant. *i* Within three miles of Public Square. *j* 5% discount for cash. *k* Discount of 2 percent for cash in 10 days. *l* Up to 200 cu. yd. *m* 50c. off for cash. *n* 25 c.y. or more. *o* 2% off for cash. *p* 10c. per ton off, cash 15 da *r* 10c. per bbl. off, cash 20 days. *s* 8% sales tax included. *t* 8% sales not included. *u* Price withdrawn. *v* 20c. per bbl. discount; 20c. allowed returnable cloth bag. *w* Cinder. *x* Waylite. *y* Haydite. *z* Celocrete. *aa* Pumi *bb* 4 x 8 x 12 in. *cc* Also 8 x 18 x 18 in. *dd* Corrected price; also applies for July.

CASH DISCOUNTS CEMENT to Contractors: truck delivery, 2% for cash on 10th of month; on carload deliveries, no trucking, same as dealer cash disc 10c. per bbl. for payment within 15 days of date of invoice. Subject discount 10c. per bbl. 20 days in Montreal.

CURRENT MAXIMUM PRICE BASES AT CEMENT MILL

Charge for bags not included. For cloth bags, add 40c. per bbl.; 10c. refund allowed for each returnable bag; for paper bags add 15c. per bbl., not refundable

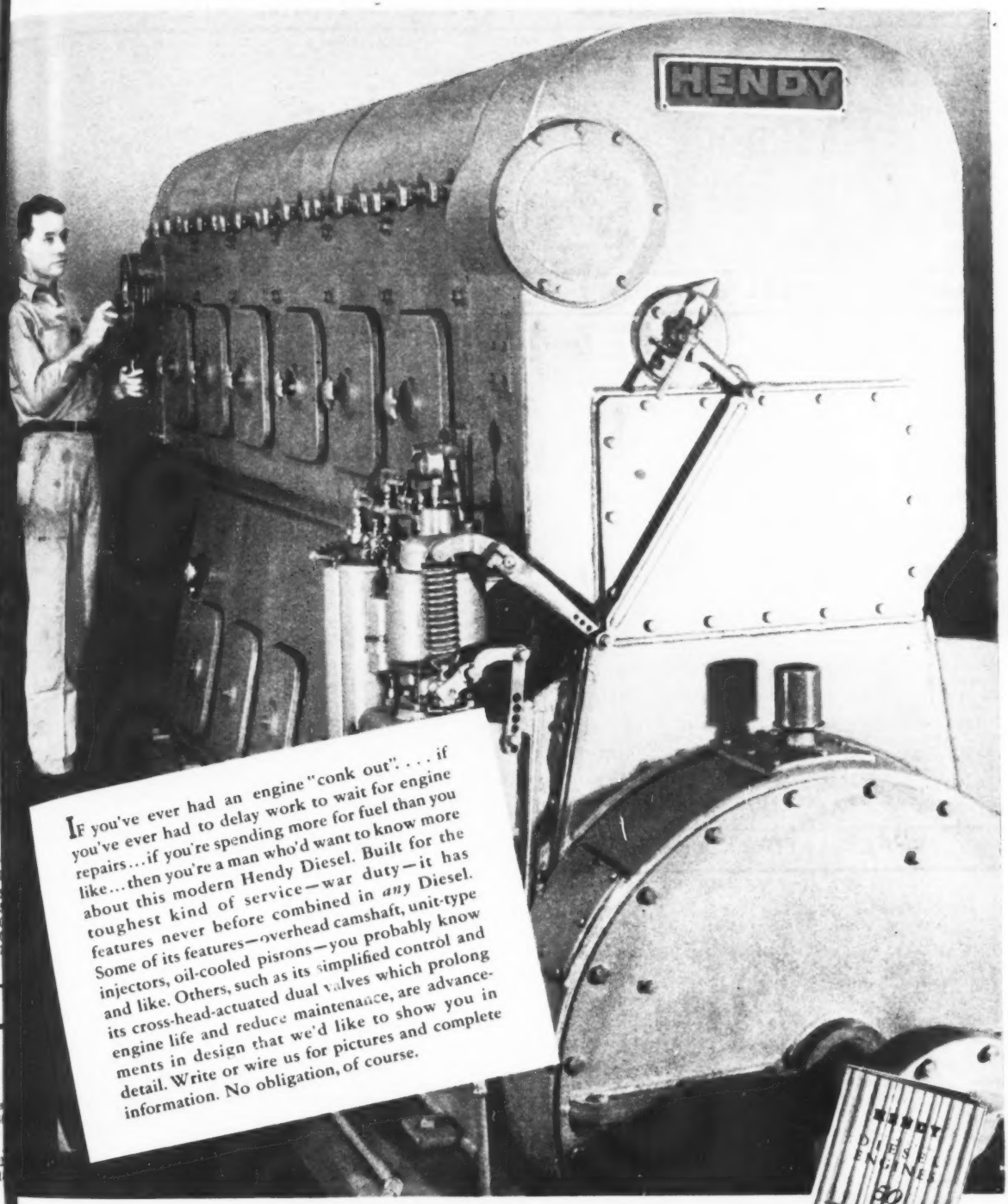
	Bagged	Bulk
Buffington, Ind.	$1.70	$1.65
Dallas, Tex.	....	....
Hannibal, Mo.	1.70	1.65
Hudson, N. Y.	....	....
Independence, Kans.	1.70	1.65
Ironton, Ohio	$1.60	$1.55
Limedale, Ind.	....	....
Norfolk, Va.	....	....
Northampton, Pa.	1.75	1.70
North Birmingham, Ala.	....	....
Richard City, Tenn.	$1.80	$1.7
Steelton, Minn.	1.80	1.7
Universal, Pa.	1.65	1.6
Waco, Tex. (Plus 9c. tax in Tex.)	1.75	1.7
Montreal (8% sales tax incl.)	1.68	1.6

Discount 10c. per bbl. 20 days

PAVING BRICK, BLOCK, ASPHALT, ROAD OILS—F.O.B. CITY

	PAVING BRICK AND BLOCK Granite per M. lots of 50,000	Brick per M 3x4x8½ in	Wood per sq. yd. 3½ in.	PAVING ASPHALT Per ton, less than 80 penetration		ASPHALT BINDERS—FLUXES Per gal., 80–300 penetration		CUTBACK ASPHALT Per ton		ROAD OIL Per gal.		ASPHALT EMULSION (Quick-breaking) Per gal.	
	4x4x8 in.	carload lots	16-lb. treat	Tank car	Drums	Tank car	Drums	Tank car	Drums	Tank car	Tank car	Drums
Atlanta	$73.00	$39.35	$2.25	$18.53*c*	[$24.62*c*	$0.0740*c*	$0.1309*c*	$0.0802*he*	$0.1348*h*	$0.0676*c*	$0.0826	$0.138
Baltimore	150.00‡	49.00	82.50*m*	15.00*r*	21.00*r*	.06*r*	.09*r*	13.00*r*	23.00*r*	.065*r*	.07*r*	.14*r*
Birmingham	150.00	48.00	.....	17.95	.....†	.0747	.....†	.0834*h*	.....†	.065	.09	.....
Boston	85.00	59.00	3.75	17.00	24.00	.20	.22	25.00	30.00	.....	.1125	.132
Chicago	150.00	55.00	2.50/2.80*d*	14.00	22.50	13.00*g*	21.50*g*	.0575*h*	.15*h*	.05*n*	.09/10*n*	.13/.1
Cincinnati	120.00	50.00	.....	16.40	.....	.085	.....	12.25	.....	.07	.085	.....
Cleveland	118.00	37.25	2.50	16.00	18.00	.085	.095	.10*h*	.....	.095	.095	.....
Dallas	.....	36.00	.....	13.65	20.30	.06	.11	16.00	24.80	.06	.05/.07	.07/.09
Denver	.....	16.11	.....	11.00	.....	10.00	.....	.045*h*	.....	.....	.....	.....
Detroit	.....	37.00	.....	18.06*f*	25.60*f*	.0743	.128	.0718*h*	.119*h*	.067	.0775	.114
Kansas City	.....	40.00	.....	18.50	23.50	.077	.1075	.077*h*	.107*h*	.057	.11	.15
Los Angeles	.....	50.00	.....	9.00*b*	23.00	9.50*bg*	24.00*bg*	9.50*b*	.....	.025	.072	.15
Minneapolis	.....	.....	2.30*d*	.....	27.70	.....	.126	.....	32.64	.....	.....	.....
Montreal	92.40	.....	.....	16.60*k*	24.25*k*	.116*k*	.1485*k*	.115*hk*	.135*hk*	.08*k*	.135*k*	.188
New Orleans	.....	.....	.....	13.50*a*	20.00*a*	.057	.088	.06*h*	.095*h*	.....	.080	.....
New York	.....	65.00	.....	17.40	24.20*p*	14.00	.....	.0725*h*	.1325*hp*	.....	.0725*p*	.119
Philadelphia	140.00	58.00	4.06	15.00*r*	.....	14.00*r*	.....	.065*hr*	.....	.....	14.00*pr*	.....
Pittsburgh	135.00	38.75	.....	18.00	23.00	.09	.16	20.00	36.00	.07	.08	.11
St. Louis	.....	37.00	.....	16.00	22.00	15.00*g*	21.00*g*	.0575*h*	.1212*h*	.648	.06	.11
San Francisco	.....	40.00	.....	10.90	21.15	10.90*g*	18.00*gr*	12.90	17.50*r*	9.50*gr*	.0525	.112
Seattle	.....	60.00*e*	.....	10.90*i*	23.40*i*	.....	20.40*gi*	11.40*i*	.....	.....	.0525*i*	.052

‡ Delivered. *a* F.o.b. Baton Rouge. *b* Delivered to purchaser's warehouse. *c* 3½x4x8¼ in. *d* 2¼ in. 12-lb. treatment. *e* Local reduction due to 20% reduction intra-state class freight rates, only Georgia affected. *f* Mexican. *g* Per ton. *h* Per gallon. *i* F.o.b. Martines. *j* 3x3½x8¼ in. *k* Tax included. *m* thousand. † Available on priority only and quoted specially. *p* No steel dr shipments except to armed forces. *r* February 1943 prices, none later avail



IF you've ever had an engine "conk out"; . . . if you've ever had to delay work to wait for engine repairs . . . if you're spending more for fuel than you like . . . then you're a man who'd want to know more about this modern Hendy Diesel. Built for the toughest kind of service—war duty—it has features never before combined in *any* Diesel. Some of its features—overhead camshaft, unit-type injectors, oil-cooled pistons—you probably know and like. Others, such as its simplified control and its cross-head-actuated dual valves which prolong engine life and reduce maintenance, are advancements in design that we'd like to show you in detail. Write or wire us for pictures and complete information. No obligation, of course.

JOSHUA HENDY Division

JOSHUA HENDY IRON WORKS

SUNNYVALE, CALIFORNIA

Specifications—6 and 8 cylinders; 4-stroke cycle; 12" bore; 15" stroke; 350-675 hp.

EST. 1854

Branch Offices: BOSTON • BUFFALO • CHICAGO • CINCINNATI • CLEVELAND • DETROIT • NEW YORK • PHILADELPHIA • PITTSBURGH • SAN FRANCISCO • ST. LOUIS • WASHINGTON • LOS ANGELES

TURBO-GENERATORS

REDUCTION GEARS

STEAM TURBINES

DIESEL ENGINES

IRON AND STEEL PRODUCTS—BASE MILL PRICES

	STRUCT. SHAPES-PLATE	REINF. BARS ¾-in. billet *b*	RIVETS ¾-in. structural	WIRE NAILS Base *d*	SHEET PILING Base	STEEL RAILS Per Gross Ton: Standard	Light	Re-rolled	TRACK SUPPLIES: Angle Bars	Std. Spikes *e*	Tie Plates *e*	Track Bolts
Birmingham	$2.10	$2.15	$3.75	$2.55	.....	$40.00	$40.00	$39.00	$2.70	$3.00	$2.15	$4.75
Chicago	2.10	2.15	3.75	2.55	$2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Pittsburgh	2.10	2.15	3.75	2.55	2.40	40.00	40.00	39.00	2.70	3.00	2.15	4.75
Buffalo	2.10	2.15	.....	.....	2.40	.....	.....	.....	.....	.....	2.15	.....
Cleveland	2.10	2.15	3.75	2.55	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown	.....	2.15	.....	.....	.....	.....	.....	.....	.....	3.00	.....	.....
Detroit	.....	2.27‡	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Gulf ports	2.47*a*	2.52*a*	.....	.....	2.85*a*	.....	.....	.....	.....	.....	.....	.....
Pacific ports	2.75*a*	2.80*a*	.....	3.05	2.95*a*	.....	.....	.....	.....	.....	2.30	.....

‡ Delivered. *a* F.o.b. cars dock. *b* Rail steel same as billet prices. *c* Other basing points include Portsmouth, O., Weirton, W. Va., St. Louis, Kansas City, Minnequa, Colo., and Pacific coast ports, on tie plates alone, Scranton, Pa., spikes alone, Lebanon, Pa., Richmond, Va. *d* Add switching charge $18 per

IRON AND STEEL PRODUCTS—F.O.B. WAREHOUSE, PER 100 LB., BASE PRICE

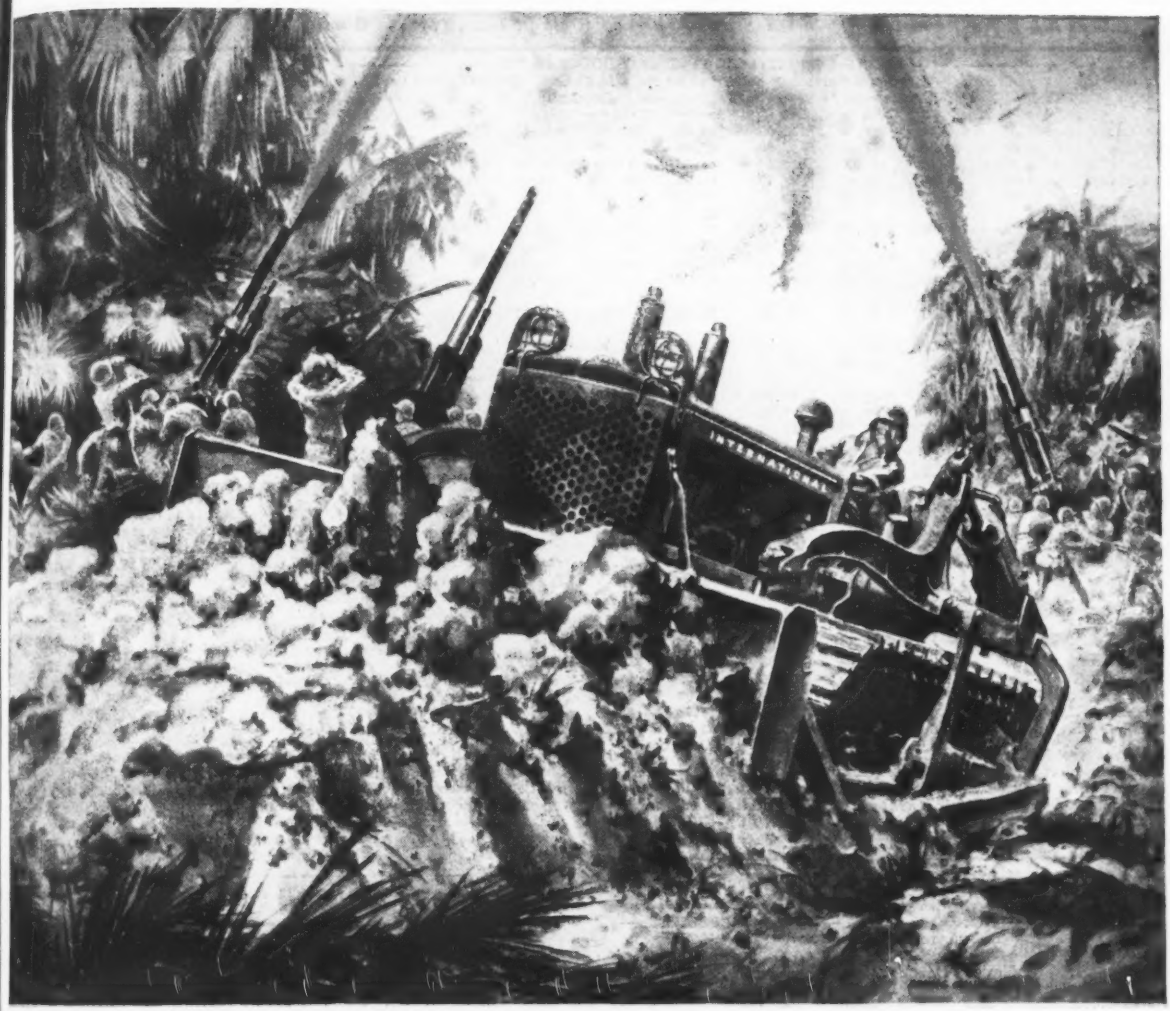
	STRUCTURAL SHAPES Per 100 lb. base price	REINFORCING BARS* Per 100 lb., ¾ in., base price: 15 tons or over *b* New billet	Rail steel	Add Switch	$/cwt. for Del.	EXPANDED METAL LATH Per 100 sq. yd., carload lots: Std. diamond mesh, 3.4 lb.	Std. ribbed 3.4 lb.	WELDED FABRIC REINFORCING Per 100 sq. yd., carload lots: 4x16 in., No. 5 & 10 wires	4x12 in., No. 8 & 12 wires	6x6 in. No. 6 & 6 wires Per sq. yd.	SHEET PILING Per 100 lb. base price
Atlanta	$2.34	$2.40	$2.40	$.02½	$.10	$21.06	$23.00	$1.82	$1.35	$0.1719	$3.04
Baltimore	3.70	2.90	2.75	.....	.10	22.50	24.50	1.70	1.27	.1611	3.00
Birmingham	2.10*a*	2.15	2.15	.02½	.10	19.00	21.00	1.80	1.34	.1701	.....
Boston	3.912	3.994	....	$20 C.L.	.10	18.50	29.50	1.76	1.31	.1656	2.77
Chicago	2.10*a*	2.15	2.15	.03	.05	21.50	23.50	1.67	1.25	.1575	2.40
Cincinnati	3.68	2.53*cd*	2.53*cd*	.....	.05	19.50	21.50	1.66	1.25	.1566	.....
Cleveland	2.10*a*	2.15	2.15	.02½	.10	19.50	21.00	1.66	1.25	.1566	.....
Dallas	4.25	3.17	3.17	.....	....	25.00	27.50	1.93	1.42	.1827	.....
Denver	4.57	3.33*cl*	....	.....	....	26.50	26.50	1.97	1.45	.186	.....
Detroit	3.65‡	2.52‡	2.52‡	.....	.10	30.00	30.00	1.68	1.26	.1584	2.66
Kansas City	4.19	2.61*cd*	2.61*cd*	.0	.05	24.50	26.50	1.78	1.33	.1683	2.874
Los Angeles	3.65*f*	2.575	2.425	.02½	.05	23.00	27.50	1.93	1.42	.1827	3.65
Minneapolis	3.81‡	2.73	2.73	.0	.10	25.00	27.00	1.80	1.34	.1701	2.73*d*
Montreal	3.95*i*	2.90*i*	2.80*i*	.....	....	26.00*hij*	33.00*hij*	2.25*i*	3.14*i*	.2281	.....
New Orleans	4.229‡*k*	2.52	2.52	.05	.10	19.00	21.00	1.82	1.35	.1715	2.873
New York	3.75	2.76*c*	2.76*c*	.....	.15	17.50	19.50	1.76	1.32	.1665	2.74
Philadelphia	3.66	3.67	....	.....	....	19.50	21.50	1.71	1.28	.1611	2.72
Pittsburgh	2.10*a*	2.15	2.15	.02½	.10	23.00	26.50	1.59	1.20	.1503	2.40
St. Louis	3.697	2.74	2.74	.0	.05	28.00	34.00	1.69	1.27	.1602	2.70
San Francisco	4.35	2.825	2.675	.02½	.10	21.00	24.50	1.93	1.42	.1827	3.85
Seattle	2.75*e*	2.80*e*	....	.....	....	34.50	38.50	1.93	1.42	.1827	2.95*el*

‡ Delivered. *a* Mill prices. *b* 5–15 tons, add 15c. 1–5 tons, add 25c. Less than 1 ton, add 50c. *c* 20 tons or over Base. *d* Mill price plus freight. *e* F.o.b. dock. *f* Includes delivery in free delivery zone. *g* Less than 1 ton, add 25c.; 1 to 5 tons, add 10c. * High scrap steel prices cut former 15c. differences between billet and rail steel in many mills. *h* List price *i* Plus Dominion and Province sales tax. *j* August 1942 price; not on market. *k* Quotation on changed basis; actual price change. *l* Approximate Denver price out of wholesale stocks, based on Chicago area; not comparable with preceding prices.

PLUMBING, HEATING, WATER, SEWER AND DRAIN PIPE

	C. I. PIPE Per net ton f.o.b. 6 in. to 24 in.*a*	VITRIFIED SEWER PIPE Per foot, std. 8 in., s.s	Delivered std. 12 in., s.s.	ASTM 24 in.,	C13–35 36 in.	CLAY DRAIN TILE Per 1,000 ft., car load lots, f.o.b. 6 in.	8 in.	CONCRETE SEWER PIPE Per ft., delivered; ASTM 12 in.	C 14–35 24 in.	WROUGHT STEEL PIPE Full standard weight, *h*: 1 to 3 in., Black	Galv.	Butt Weld 3½ to 6 in.: Black	Lap Weld Galv.
Atlanta	$49.66	$0.265	$0.4685*bc*	$1.8525	$4.68*c*	$85.00	$128.00	$0.45	$1.642	48.2	54.2	59.7	51.2
Baltimore	53.00	.35	.60	2.70	7.25	160.00	200.00	.55	1.80	65.5	57.5	63.0	54.5
Birmingham	45.00	.275	.495	1.95	5.50	100.00	220.00	.50	1.70	62.2	54.2	59.7	51.2
Boston	55.40	.371*r*	.7155*r*	2.79*r*	7.6875*r*	155.00‡*r*	245.00‡*r*	.60	....	.....	.....	.....	.....
Chicago	54.33	.35	.675	2.70	7.00	100.00‡	150.00‡	.45	1.85	66.0	55.0	64.5	53.0
Cincinnati	53.27	.231	.4455	1.80	5.125	105.00‡*s*	170.00‡*s*	.75*t*	1.75*t*	57.1	43.4	54.0	39.6
Cleveland	54.75	.266*r*	.513*r*	2.115*r*	5.535*r*	90.60	139.40	.36	1.38	68.5	57.5	66.0	54.5
Dallas	56.43	.31	.58	2.25	5.00	90.00	110.00	.46	1.57	59.9	51.9	57.3	48.3
Denver	61.56	.29†	.52†	2.16†	3.00*n*	125.00	200.00	1.00	2.22	58.4	50.4	55.7	47.2
Detroit	54.75	.35	.675	2.70	7.75	135.00	200.00	.40	1.75	57.6	44.0	54.5	40.2
Kansas City	55.73	.315	.39	2.20	5.86	140.00	260.00	.45	1.60	35.9	46.4	46.6	39.9
Los Angeles	68.40	.282†	.508†	2.034†	5.085†	115.50	192.50	1.00	2.00	61.1	50.1	58.6	47.1
Minneapolis	57.47	.275†	.495†	1.98†	5.37†	.....	.....	.90	2.10	64.2	53.2	60.7	49.2
Montreal	67.00	.85*o*	1.50*o*	5.25*p*	8.50*ep*	45.00*m*	64.00*m*	.48*mt*	1.92*mt*	....	....	....	....
New Orleans	51.78	.26	.48	1.69	....	150.00	220.00	.45	1.65	62.4	54.4	58.8	50.3
New York	52.40	.308	.594	2.52	6.45	.....	.....	.60	1.40	64.9	53.9	62.4	50.9
Philadelphia	51.00	.335	.675	2.75	7.50	150.00	225.00	.45	1.75	56.6	42.8	53.6	39.1
Pittsburgh	56.00	.266†	.513†	2.295†	5.945	97.80	154.20	.85*g*	2.00*g*	68.5*i*	57.5*i*	66.0*i*	54.5*i*
St. Louis	53.62	.28	.504	2.016	4.50	85.00	220.00	1.25*j*	2.25*k*	56.4	42.6	52.5	38.4
San Francisco	68.40	.3625*l*	.6525*l*	2.61	6.52	115.00	192.50	.58	2.34	45.0	31.0	41.0	26.0
Seattle	70.20	.375	.675	2.70	6.75	84.00	187.50	.51*f*	1.44*f*	....	....	....	....

‡ Delivered. † F.o.b. *a* B. & S. class B and heavier, C. I. lots, 200 tons and over Burlington, N. J. (base) $49.00. Based on existing freight rates; subject to rate change. Gas pipe and class A. $3 per ton additional. 4 in., $3 per ton additional, 30 in. and larger usually $2 per ton less. *b* Double strength. *c* List to dealer. *d* List. *e* 30-inch. *f* Less 5% for cash. *g* Culvert pipe. *h* Discounts from standard list consumers carload prices, except Pittsburgh prices are f.o.b. mill. Base price $200 per net ton. List prices per ft.: ½ in., 8½c.; ¾ in., 11½c.; 1 in., 17c.; 2 in., 37c.; 2½ in., 58½c.; 3 in., 76½c.; 4 in., $1.09; 6 in., $1.92 3 per cent tax on transportation costs not included. *i* Applies also at Lorain, Ohio, mills. Chicago delivered base is 2½ points less on butt, 1½ on lap. Freight is figured from Pittsburgh, Lorain, O., Chicago Dist. Billing is from point producing lowest price at destination. WROUGHT IRON PIPE: Base prices and list prices per ft. same as wrought steel pipe. Discount for Pittsburgh base: Butt-weld—1 in. and 1¼ in. black 34, galv. 16; 1½ in. black 38, galv. 18‡; 2 in. black 37½, galv. 18. Lapweld—2½ in. to 3½ in. black 31½, galv. 14‡; 4½ in. to 8 in. black, 32½ galv. 17. *j* Reinforced; spec. C 76–37. *k* Reinforced; spec. C 75–37. *l* Plus sales tax. *m* Tax included. *n* 27-in. pipe. *o* Less 50% *p* Less 53%. *r* Truck delivery. *s* Price quotations on delivered basis since May, 1940; current f.o.b. price $84 for 6 in.; $130 for 8 in. *t* Reinforced pipe prices since May, 1937; current plain pipe prices are: 12 in., 36c.; 24 in., $1.50.



TODAY
A JUNGLE
TOMORROW
A RUNWAY

WILL THEY EVER mount a Diesel Tractor alongside the cannon on a courthouse lawn to honor this great combat weapon?

Anyway, it's an idea! For here's a peace-time builder that's a sensation on the battlefield, winning praises from GIs and Generals alike—moving dirt, rock, sand, frozen tundra and jungle swamp—by the ton and in a hurry.

Tens of thousands of International Tractors are serving the military—in the Army, the Navy, the Marine Corps and the Air Forces. Tractors pave the way for airpower, footpower and firepower . . . *All honor to the men who drive them!*

While these tractors are fighting on the battlefront, it's up to all tractor operators to conserve equipment here on the home front. *Make it last!* Harvester and the International Power Distributors stand ready to see you through.

If your need for new equipment is vital to the war effort, we will have equipment for you. If your need is less vital we will safeguard your present International Power with every service at our command.

And in the meantime, let's all remember that it's up to all of us to fight harder on the home front . . . fight on the food front—give to the blood bank—buy extra War Bonds—fight inflation. FOR VICTORY.

INTERNATIONAL HARVESTER COMPANY
180 North Michigan Avenue Chicago 1, Illinois

INTERNATIONAL HARVESTER

Power for Victory . . . Power for Peace

LUMBER, TIMBER PLYWOOD—PER M FT., B.M., CARLOAD LOTS F.O.B.

	SHORT LEAF YELLOW PINE AND DOUGLAS FIR — All S. L. Y. P. is No. 2 common or better end for No. 1 N. C. Box. (Prices in Bold Face) — All Fir planks No. 2 common, Fir timber is No. 1 common. Lengths up to 20 ft. (Prices in italics)								LONG LEAF Y. P. Merchantable grade up to 20 ft.		PLYWOOD Rail freight increment (See note for base price)	
	1x6 S4S	1x8 S4S	2x4 S4S	2x6 S4S	2x8 S4S	2x10 S4S	3x12 Rgh	6x12 Rgh	2x12 Rgh	12x12 Rgh	3/8"	3/4"
Atlanta	**$40.00**	**$40.00**	**$37.00**	**$35.00**	**$34.00**	**$37.00**	**$46.00**	.....	**$57.00**	**$64.00**	**$17.90**	$21.85
Baltimore	**44.00**	**46.00**	**44.00**	**46.00**	**47.00**	**52.00**	**65.00**	.....	**115.00**	**120.00**	**18.25**	22.25
	48.00	*49.00*	*55.00*	*55.00*	*55.00*	*57.50*	*68.00*	*$75.00*	.....	.....	.....	.....
Birmingham	**45.00**	**45.00**	**44.50**	**43.50**	**44.50**	**47.50**	**68.00**	**55.00**	**56.00**	.....	**17.35**	21.15
[1]	**50.00**	**50.00**	**49.50**	**48.50**	**49.50**	**52.50**	**72.00**	.....	.....	**67.50**	**70.00**	.....
Boston	**60.00**[a]	**60.00**[a]	**60.00**[a]	**60.00**[a]	**60.00**[a]	**62.00**[a]	**66.00**[a]	.....	.....	**58.00**[a]	**58.00**	**18.25**	22.25
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*54.00*	*58.00*	*58.00*	*58.00*	.....	.....	.....	.....
Chicago	**54.00**	**54.00**	**55.00**	**54.00**	**54.00**	**60.00**	**68.00**	.....	.....	**80.00**[l]	**95.00**[l]	**14.60**	17.80
	55.00	*55.00*	*54.00*	*54.00*	*54.00*	*55.00*	*56.00*	*56.00*	*57.00*	.....	.....	.....	.....
Cincinnati	**47.50**	**49.00**	**42.50**	**42.50**	**42.50**	**44.50**	**67.00**	.....	.....	**65.00**	**65.00**	**17.35**	21.15
	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Cleveland	**42.50**[k]	**42.50**[k]	**52.50**[k]	**51.00**[k]	**65.00**	**65.00**	**83.00**	**83.00**	**83.00**	.....	.....	**17.75**	21.60
Dallas	**45.25**	**45.25**	**44.50**	**43.00**	**43.00**	**47.25**	**60.75**	**58.75**	**58.75**	**88.75**	**85.00**	**14.60**	17.80
Denver	**63.50**[a]	**62.00**[a]	**65.00**[a]	**65.00**[a]	**65.00**[a]	**66.00**[a]	**69.00**[a]	*88.00*	*89.00*	.....	.....	**10.45**	12.70
Detroit	**61.00**	**61.00**	**57.75**	**57.75**	**57.75**	**63.75**	**71.00**	**70.75**	**90.00**	**70.75**	**90.00**	**17.35**	21.15
	57.00	*57.00*	*57.00*	*57.00*	*62.75*	*72.75*	*75.00*	*75.00*	*90.00*	.....	.....	.....	.....
Kansas City	**69.00**	**69.00**	**67.00**	**65.50**	**67.00**	**69.00**	**84.00**	.....	.....	**84.00**	**94.00**	**12.60**	15.40
	66.00	*66.00*	*59.50*	*59.50*	*59.50*	*59.50*	*75.00*	*80.00*	*80.00*	.....	.....	.....	.....
Los Angeles	*60.00*	*60.00*	*60.50*	*60.75*	*59.25*	*59.25*	*72.75*	*72.00*	*72.00*	.....	.....	**9.90**[h]	12.05[h]
Minneapolis	**59.00**[a]	**59.00**[a]	.....	.....	.....	.....	.....	.....	.....	.....	.....	**12.60**	15.40
[•]	*58.50*	*64.75*	*57.00*	*57.25*	*56.25*	*57.00*	*61.50*	*59.75*	*59.75*	.....	.....	.....	.....
Montreal	*58.00*	*61.00*	*54.00*	*58.00*	*60.00*	*66.00*	.....	.....	.....	**200.00**	**200.00**	.....	.....
	54.00	*54.00*	*57.00*	*57.00*	*57.00*	*58.75*	*62.00*	*62.00*	*62.00*	.....	.....	.....	.....
New Orleans	**40.00**	**40.00**	**37.00**	**35.00**	**34.00**	**36.00**	**46.00**	.....	.....	**55.00**	**69.00**	**14.60**	17.80
	31.00	*31.00*	*35.00*	*31.00*	*34.00*	*32.00*	*33.00*	.....	.....	.....	.....	.....	.....
New York	**67.50**	**67.50**	**62.50**	**62.50**	**62.50**	**64.00**	**74.00**	.....	.....	**120.00**[f]	**125.00**[f]	**18.35**	22.25
[‡]	.....	.....	*65.00*[i]	*65.00*[i]	*65.00*[i]	*65.00*[i]	[Range from $75 to $95]			.....	.....	.....	.....
Philadelphia	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	**75.00**	.....	.....	**130.00**	**130.00**	**18.25**	22.25
	75.00	*75.00*	*76.00*	*75.00*	*75.00*	*75.00*	*85.00*	*90.00*	*90.00*	.....	.....	.....	.....
Pittsburgh	**50.80**	**53.20**	**62.75**	**55.00**	**60.85**	**62.50**	**76.25**	.....	.....	.....	.....	**18.10**	22.05
	69.20	*68.10*	*68.10*	*65.20*	*65.20*	*65.65*	*88.75*	*88.75*	*88.75*	.....	.....	.....	.....
St. Louis	**59.00**	**59.00**	**56.00**	**55.00**	**56.00**	**57.00**	**67.00**	*75.00*	*75.00*	**87.00**	**87.00**	**14.60**	17.80
San Francisco	*41.00*	*41.00*	*36.50*	*36.75*	*35.75*	*35.75*	*57.50*	*56.00*	*56.00*	.....	.....	**7.30**[j]	8.90[j]
Seattle	*35.00*	*35.00*	*35.00*	*35.00*	*35.00*	*35.00*	*40.00*	*40.00*	*40.00*	.....	.....	**0.00**	0.00

Bold Face type, Southern Pine. *Italics, Douglas Fir.* [1] Long leaf. [2] Roofers, N. C. Pine. [3] Spruce. [4] Native. [5] Western Pine, No. 3 Common. [7] Spruce. [8] Norway Pine. ‡ Delivered. *a* Yard prices. *b* Contractors discount in Minneapolis and St. Paul discontinued May 21, 1938. *c* 5M ft. or less. *d* F.o.b. cars San Francisco freight rate. *e* 10% discount taken off. *f* Up to 18 ft. † Plus sales tax.

Note: Special concrete form grade Fir Plywood, 4' by 8' panels, 5-ply, sanded 2 sides, water resistant glue, carload lots, delivered per 1,000 sq. ft. surface. Seattle base price on 3/8", $95.15; on 3/4", $104.85; price includes oiling and sealing charges. For other centers add rail freight increment from table or proper size. For resin dipped treatment, add $10.50 per M. *g* Lower rate by water shipment. *h* 50,000 lb. minimum. *i* Ranges from $65 to $69. *j* Average price. *k* August 1943 price. *l* September price; none later available.

GLASS, EXPLOSIVES, CHEMICALS

	WINDOW GLASS — Discounts from jobbers list, Aug. 15, 1938 Single or Double Thickness A quality	B quality	EXPLOSIVES — Per lb. 40% Ammonia Gelatin in 50-lb. cases delivered in 200 lb. lots*
Atlanta	75%	75%	$0.15
Baltimore	78%	79%	.15
Birmingham	76%	76%	.105
Boston	77%	78%	.15
Chicago	77%	77%	.15
Cincinnati	77-10%	77-10%	.15
Cleveland	77-10%	77-10%	.19
Dallas	76%	76%	.1625
Denver	76%	76%	.155*e*
Detroit	77%	77%	.1575
Kansas City	77-10%	77-10%	.155
Los Angeles	86%*d*	88%*d*	.1575
Minneapolis	77%	77%	.155
Montreal	40-5%*ab*	47%*ac*	.1675†
New Orleans	70%	75%	.16
New York	81%	82%	.22*f*
Philadelphia	78%	79%	.15
Pittsburgh	79%	79%	.1225
St. Louis	77-10%	77-10%	.155
San Francisco	66%	73%	155
Seattle	75%	75%	.1575†

Price of 60% Ammonia Gelatin in $0.01 per lb. higher than 40%

a Discount from list Sept. 1939; sales tax included, but 6% tax exemption not allowed for. *b* Single thickness. *c* Double thickness. *d* Discount from jobbers' list Sept. 15, 1928.

* Urban prices influenced by service charges or local storage and delivery regulations, do not consistently reflect quantity prices in less congested areas. *e* F.o.b. Louviers, Colo. *f* In boroughs of Kings, Queens and Richmond, and in Manhattan south of Canal St. add delivery charge of $6.00 per trip. † F.o.b.

40% Ammonia Gelatin price ranges in other than urban areas, per lb. (except Seismograph Grades)

	C/L 20,000 lb. net	Tons	200 lb. lots
E. of the Miss., except Fla and Me.	$0.105	$0.13	$0.15
W. of Miss. to Rocky Mtn. States, Fla. and Maine	.11 -.1175	.125 -.1475	.155 -.1675
Rocky Mtn. States	.11 -.1225	.135 -.1525‡	.155 -.1725‡
Pacific N. W. States	.1075-.12	.1375-.15	.1575-.17
Pacific S. W. States	.1050-.1125	.135-.1425	.155-.1625

‡ F.o.b. Louviers, Colo., or Butte, Mont.

PILES, TIES—F.O.B.

PILES

Prices per linear foot, fir and pine, bark on, f.o.b. cars, New York. Fir based on Wash. and Ore. points to New York shipping area; pine based on freight from Norfolk.

Dimensions	Points	Length	By Rail — Pine*	Fir
12-in. at butt	6-in.	30 to 50-ft.	$0.34	....
12 in.—2 ft. from butt	6-in.	50 to 59-ft.	.35	....
12-in.—2-ft. from butt	6-in.	60 to 69-ft.	.36	....
12-in.—2-ft. from butt	6-in.	90 to 100-ft.	....	.515
13-in.—3-ft. from butt	5-in.	91 to 100-ft.	....	.5825
14-in.—2-ft. from butt	6-in.	50 to 69-ft.	.41	.62
14-in.—2-ft. from butt	6-in.	70 to 79-ft.	.43	.59
14-in.—2-ft. from butt	5-in.	80 to 85-ft.	.53	....
14-in.—2-ft. from butt	5-in.	85 to 89-ft.	.56	....
14-in.—2-ft. from butt	5-in.	90 to 100-ft.	....	.61

* Pine piling over 80-ft. available only in limited quantities.

RAILWAY TIES

Prices f.o.b., per tie for carload lots:		6"x8"x8' Untr.	6"x8"x8' Tr.	7"x9"x8'6" Untr.	7"x9"x8'6" Tr.
Boston	Oak	$1.50	....	$2.00	....
	Pine	2.00	$3.00*a*	2.50	$3.00*a*
New York	S. L. Sap Pine	1.43/1.54	2.59	1.76	2.86
	Mixed Oak	1.71	2.59	2.42	3.58
Birmingham	White Oak	1.00	1.60*a*	....	2.25*a*
Chicago	Red Oak	....	2.00/2.25*a*	....	2.87/300
Los Angeles	Douglas Fir	2.00	3.25*a*	2.90	4.70*a*
Philadelphia	Red Oak	....	2.10*ag*	....	3.25*ag*
St. Louis	White Oak	1.48	....	2.04	....
	Red Oak	1.48	2.05*a*	2.04	2.83*a*
	Sap Pine or Cypress	1.55	....	1.91	....
San Francisco	Douglas Fir	1.25*bef*	....	....	3.00*caf*
Montreal	Birch or Maple	.85	.95	....†	....†

Tr.—Treated; Untr.—Untreated. *a* Creosoted. *b* 6"x8"x8'6". *c* Empty cell. *d* Zinc. *e* Green. *f* F.o.b. cars. † Out of market. *g* January 1943 price, none later available.

CHEMICALS

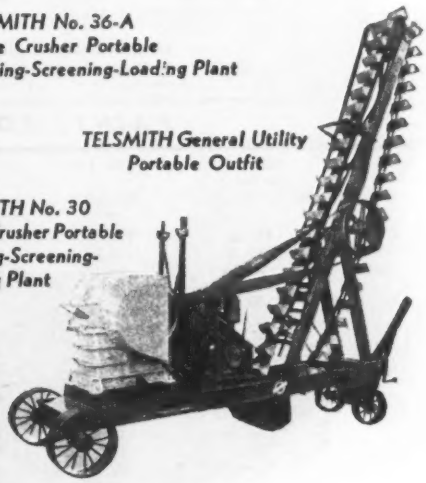
Water, sewage treatment, road work, f.o.b. carlots, New York

Bleaching powder, in drums, f.o.b. works, per 100-lb.	$2.50- 3.10
Chlorine cylinders, liquid, per lb., delivered	.0525
Calcium chloride, 77-80%, flaked, 100-lb. paper bag, del'd, ton	18.50-35.00
Silicate of soda, 52 deg. in drums, f.o.b. works, per 100 lb.	1.40
Soda ash, 58%, in paper bags, per 100 lb. dense	1.15
Sulphate of aluminum, commercial, in 100-lb. bags, per ton	23.00-25.00
Sulphate of copper, in bbl., per 100-lb.	5.00

TELSMITH Dual Portable
Crushing-Screening-Loading Plant

TELSMITH No. 36-A
Single Crusher Portable
Crushing-Screening-Loading Plant

TELSMITH General Utility
Portable Outfit



TELSMITH No. 30
Single Crusher Portable
Crushing-Screening-
Loading Plant

For large capacity . . .
with lowest operating cost

TELSMITH

PORTABLE CRUSHING PLANTS

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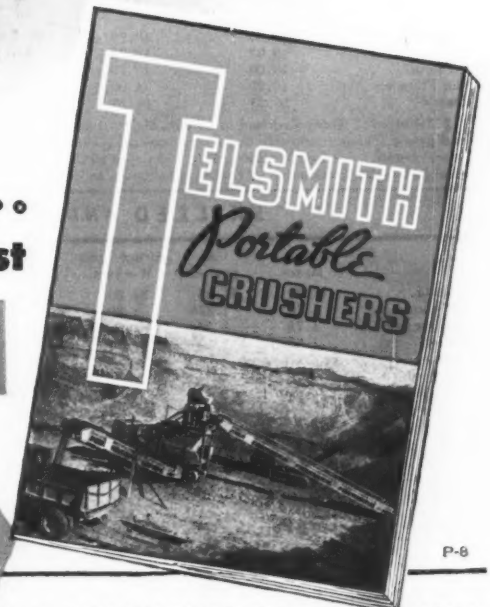

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SMITH ENGINEERING WORKS, 500 E. CAPITOL DRIVE, MILWAUKEE 12, WISCONSIN

Cable Addresses: Sengworks, Milwaukee—Concrete, London

51 East 42nd St. New York 17, N.Y.
211 W. Wacker Drive Chicago 6, Ill.
713 Commercial Trust Bldg. Philadelphia 2, Pa.
19-21 Charles St. Cambridge 41, Mass.
G. F. Seeley & Co. Toronto, Ont.
Mines Eng. & Eqpt. Co. San Francisco 4—Los Angeles 14
Brandeis M. & S. Co. Louisville 8, Ky.
Charleston Tractor & Eqpt. Corp. Charleston 22, W. Va.
Roanoke Trac. & Eqpt. Co. Roanoke 7, Va.
North Carolina Eqpt. Co. Raleigh & Charlotte, N. C.
Wilson-Weesner-Wilkinson Co. Knoxville 8 and Nashville 6, Tenn.

STRUCTURAL CLAY BUILDING TILE, BRICK AND LIME—DELIVERED

	STRUCTURAL CLAY TILE—PARTITION—SCORED Per M. lots of 2,000 pieces or over, 3x12x12 in.	4x12x12 in.	8x12x12 in.	STRUCTURAL CLAY TILE—LOAD BEARING—SCORED Per M. lots of 2,000 pieces or over, 8x12x12 in.	10x12x12 in.	12x12x12 in.	BRICK—Per M. in quantity, Common backing	Straight hard	LIME—Per ton, Hydrated finishing	In paper, Common hydrated	Carload lot, Pulverized, or lump
Atlanta	$104.00	$114.00	$199.00	$234.00	$244.00	$250.00	$15.00	$18.04	$26.54	$15.04	$15.04
Baltimore	84.00	90.00	170.00	200.00	260.00	300.00	16.00*k*	20.00*k*	18.00	13.00	2.50*m*
Birmingham	80.00	85.00	160.00	191.00	252.00	288.00	14.50	17.00	18.11	13.64	2.25*o*
Boston	103.75*a*	110.65*a*	207.45*a*	248.90	.....	.....	20.00*i*	20.00*i*	21.00*t*	.....	16.00
Chicago	72.00	77.00	145.00	197.00	243.00	278.00	12.50	13.50	17.00	15.00	12.5*o*
Cincinnati	65.55	69.90	131.20	148.70	210.35	240.45	22.00	22.00	15.50	13.00	...
Cleveland	62.75	66.95	125.50	150.60	201.90	231.15	17.00	17.00	15.75*j*	13.25*j*	3.50*q*
Dallas	62.50	67.50	135.00	162.00	212.50	263.00	13.50*i*	15.00*i*	19.00	15.00	15.00
Denver	84.80	95.40	153.70	178.20	212.00	227.90	14.50	18.00	25.00*j*	17.00*j*	20.00*j*
Detroit	92.70	96.70	181.20	206.75	267.50	306.00	20.75	20.75	18.00	16.00	16.00
Kansas City	67.00	69.00	89.00*c*	128.00	163.00	189.00	14.50	16.50	19.32	13.00	10.92
Los Angeles	73.50†*r*	89.50†*r*	128.00*c*†*r*	210.00†*r*	368.00†*r*	460.00†*r*	13.50	15.00	16.50	17.50	17.50
Minneapolis	81.00*b*	86.40*b*	159.90*b*	.....	177.00*b*	246.00*b*	13.60	15.60*g*	21.00	16.00	19.00
Montreal	94.55*a*	100.45*a*	199.50*a*	160.45*a*	109.40*at*	137.40*av*	21.08†*u*	28.35†*u*	24.60*u*	18.00*u*	...
New Orleans	72.00	72.00	135.00	162.00	210.00	260.00	14.00	.....	18.30	12.08	14.10
New York	78.40	83.60	115.00*c*	193.30*h*	238.80*h*	295.60*h*	17.00/18.00	.....	20.00	14.00	17.60
Philadelphia	85.30	91.00	170.50	204.60	252.00	312.00	17.00	20.00	19.00	16.00	15.00
Pittsburgh	62.35	66.55	124.75	140.25	173.25	198.00	17.50	19.50	17.90	15.40	2.55*m*
St. Louis	67.00	95.00	130.00	190.00	244.00	290.00†	18.00	17.00	22.00	18.00	2.50*m*
San Francisco	96.00	108.00	144.00	108.00*t*	.....	.....	19.00	.....	24.00	23.00	2.50*m*
Seattle	115.00	125.00	230.00	.....	.....	.....	20.00*f*	21.00*f*	20.00*s*	20.00*s*	20.00*s*

† F.o.b. *a* Smooth. *b* Carload lots delivered to job. *c* 6x12x12 in. *d* Not load bearing. *e* 48 lb. tile. *f* Less $1.00, ½ cash 15 days, balance 30 days. *g* Selected common. *h* F.o.b. Perth Amboy, N. J. *i* F.o.b. Warehouse only. *j* LCL. *k* $1.00 discount if paid in 10 days. *l* Lump. *m* Per bbl., 180 lb. *o* Per bbl., 200 lb. *p* 280 lb. bag. *r* 5% discount 10 days. *s* 2% discount for cash. *t* 5½x8x12. *u* 8% sales tax included. *v* 6x12x12-in. *w* Per 220 lb. bag.

PAINT, ROOFING—F.O.B. CARLOAD LOTS

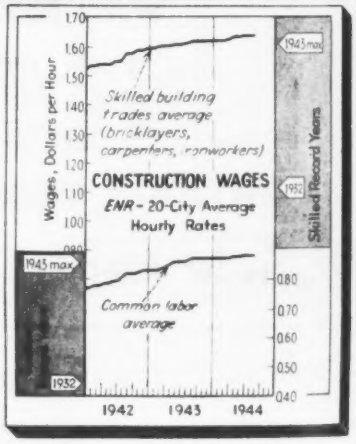
	RED LEAD Per 100 lb. in 600-lb. (Approx.) bbl. Dry *a*	WHITE LEAD Per 100 lb in oil	READY-MIXED PAINT Per gal., drums Graphite *b*	Aluminum *b*	Ferric Oxide *d*	ROOFING SUPPLIES Carload lots f.o.b factory Rolls, slate surfaced, 85–90 lb. per sq.	Asphalt felt, per 100 lb.	Tar felt, per 100 lb.	Asphalt coating per gal.	Tar pitch 350 lb. bbl. per ton
Atlanta	$10.25	$14.125	$1.30	$2.25	$1.20	$1.90	$1.61	$1.61	$0.27	$20.00
Baltimore	10.00	13.75	2.00	3.00	2.50	2.30	2.70	2.70	.40	29.00
Birmingham	10.25	14.125	2.35	3.50*r*	1.98*r*	2.04	1.97	1.97	.32	28.35
Boston	10.00	13.75	1.75	2.50	2.31	2.00‡*hw*	3.30‡*uw*	3.30‡*uw*	.25‡	21.00‡
Chicago	10.00	13.75	....	....	....	1.75*hf*	1.74*hf*	1.82*hf*	.33*f*	23.00*f*
Cincinnati	10.00	13.75	1.70	2.90	1.60	2.20	2.10*h*	2.10*h*	.33	25.00
Cleveland	10.00	13.75	1.70	2.90	1.60	1.93	1.83*h*	1.83*h*	.25	27.00
Dallas	10.00	14.50	1.88	2.11*n*	.05*l*	1.75*h*	1.66*h*	1.66*h*	.35	39.00
Denver	10.50	14.25	....	....	.27*l*	2.45	2.95	2.95	.35	28.00
Detroit	10.00	13.75	1.75	3.00	1.60	2.25	2.25	2.25	.50	23.00
Kansas City	10.00	13.875	2.30*g*	2.55*gr*	2.16*g*	2.10	2.30	2.30	.28	27.50
Los Angeles	10.25	14.25	1.60	2.25	2.30	2.10	1.50	....	.45	.....
Minneapolis	10.00	13.875	....	....	....	1.75*i*	1.66*hi*	1.66*hi*	.32	23.00
Montreal	9.25	6.25	2.50*p*	4.90*p*	3.15*p*	4.02*t*	2.58*t*	3.01*t*	.89*t*	2.10*t*
New York	10.00	13.75	2.03	....*r*	1.82	1.66	1.58*h*	1.58*h*	.26	25.00
Philadelphia	10.00	13.75	1.60/1.80	2.20*r*	1.55	1.75	1.66	1.66	.32	23.00
Pittsburgh	10.00	13.75	1.05	1.95	.80	1.95	1.94*h*	1.94*h*	.34	26.00
St. Louis	10.00	13.75	2.28*s*	2.89*s*	1.96*s*	1.66	1.66	1.66	.28	22.00
San Francisco	10.25	14.00	1.80	2.75*n*	1.35	1.71	2.40	2.40	.33	20.50
Seattle	10.25	14.25	1.90	3.00	....	2.15	2.16*h*	....	.35	26.50*j*

‡ Delivered. Note: Red lead in oil 50c. higher than white lead in oil. *a* Red lead prices change frequently due to pig lead price changes. *b* U. S. War Dept. Spec. 3-49A. *c* ASTM Spec. D266-31. *d* 80% minimum ferric oxide. *e* Subject to 25% discount. *f* Distributors' price to contractors. *g* 5 gal. can. *h* Per roll, 65 lb. *i* Minneapolis and vicinity. *j* Asphalt pitch. *k* Per 100 lb. *l* Per lb. *m* Per bbl. *n* May, 1941 price, no later quotation available. *p* Plus 8% sales tax. *r* Not available, except on priority rating; then quoted specially. *s* December, 1942 price. *t* Federal tax included. *u* 90-lb. roll. *v* Truck delivery.

SKILLED AND COMMON WAGE RATES—PER HOUR

	Bricklayers	Carpenters	Struct. Iron Workers	Hoisting Engineers	Plasterers	Common Labor—Building	Common Labor—Heavy Const.
Atlanta	$1.50	$1.25	$1.50	$1.25	$1.50	$0.40	$0.50
Baltimore	1.75	1.375	1.80	1.625/1.80	1.50	.75	.75
Birmingham	1.75	1.25	1.50	1.25/1.50	1.50	.65	.65
Boston	1.625	1.50	1.65	1.875	1.667	1.00	1.00
Chicago	1.75	1.70	1.76	1.75	1.825	1.10	1.10
Cincinnati	1.875	1.50	1.675	1.45/1.60	1.625	.85	.85
Cleveland	1.875*e*	1.575	1.875	1.875	1.875	1.085	1.15/1.25
Dallas	1.625	1.25	1.50	1.75	1.625	.60	.75/1.25
Denver	1.65*b*	1.50*b*	1.50*b*	1.50/1.625*b*	1.50*bf*	.80*b*	.80*b*
Detroit	1.725	1.50	1.75	1.675/1.75	1.725	.90	.90
Kansas City	1.65	1.50	1.625	1.625	1.65	.90	.90
Los Angeles	1.50	1.35	1.625	1.375	1.667	.875	.875
Minneapolis	1.625	1.44	1.625	1.50	1.625*e*	.95	.95
New Orleans	1.50	1.25	1.50	1.50	1.375	.65	.75
New York	2.00*b*	1.85*b*	2.00	2.00*b*	2.00*b*	1.10*f*	.95
Philadelphia	2.00	1.58	2.00	2.00	2.00	.825	.825
Pittsburgh	1.90	1.75	1.75	1.8125	1.875	.90	.80
Pt. Louis	1.75	1.50	1.75	2.00	1.75	.95	.95
San Francisco	1.875	1.50	1.75	1.50/1.75	1.75	1.00	1.00
Seattle	1.845	1.565	1.745	2.00	1.865	1.145	1.10
Montreal*	1.05	.95	1.00	.90	1.05	.60	.65

b 7 hr. day. *c* Prevailing rate on government work. *e* 35 hr. wk.
* Cost of living bonus now included in basic wage.



ENR Skilled Average: (Bricklayers, Carpenters, Ironworkers) $1.639.
ENR Common Average: $0.882.

. . . AFTER THE WASTAGE OF WAR — Miles Per Hour Or Dollars Per Mile?

America's roads and highways must soon get needed repairs. The backlog of hundreds of miles of new paving must be built. Budgets will be limited. The question is—a few miles of high-cost speedways or many miles of low-cost useful roads? That's where road-mix and the Wood Roadmixer fits into the picture.

For 14 years this pioneer traveling mixing plant has been furnishing conclusive proof that highest quality roads and airports can be built for as little as one-third the cost of conventional methods. The Wood Roadmixer and the use of common sense in the selection, proportioning and mixing of materials *on the job* will produce paving of equal or better quality than ordinary methods—and save taxpayers hundreds of thousands of dollars. *Economy must be the national watchword!*

The Wood Roadmixer is demonstrating *today* that it is the *post-war* answer to *low-cost, top-quality* pavement construction. A fully illustrated bulletin gives all the facts. Write for it.

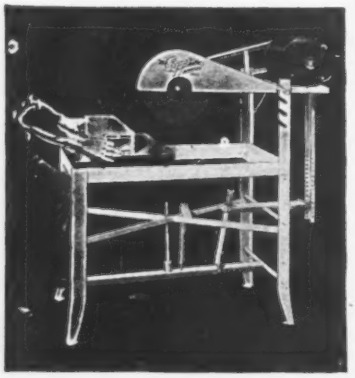
WOOD ROADMIXER—*A complete traveling mixing plant.*

DESIGN FOR ROAD-MIX **WOOD ROADMIXER**

Wood Manufacturing Co. • 816 West 5th St., Los Angeles 13, California

FASTER CUTTING
...with
Clipper Masonry Saws

Your Special Size and Shape Brick or Tile can now be "Tailor-Made" at a moment's notice!

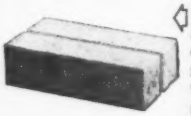


The new Clipper Multiple Cutting Principle makes possible faster cutting of every masonry material regardless of hardness.

Here are a few typical examples of the speed and accuracy with which fire brick can be cut for furnace repairs.

This acid brick intended for a chemical plant acid chamber was cut completely in two, in 37 sec.

One of many intricate cuts performed on first quality clay brick for heat treating furnaces. Made in 8 seconds.



Silica brick cut lengthwise for open hearth furnace work, only 9 seconds were required to complete this cut!

Basic refractories for steel furnaces or cement kilns must be accurately installed. This magnesite brick was cut in 12 seconds!

Clipper Saws are available for trial. Write for Descriptive Catalogs.

THE Clipper MANUFACTURING COMPANY

4016 MANCHESTER
ST. LOUIS, MISSOURI

NEW AIDS TO THE CONSTRUCTOR

Air Trap

Immediate drainage is said to be possible with a new high pressure "Snap-Action" air trap. No. 71-315, for draining water from compressed air systems under pressures up to 1,000 lb. The body and cap of this trap are forged steel, and the ball float is designed to withstand hydrostatic pressures of 1,500 lb.

When incoming water raises the float, an initially concave bent spring snaps the float up and throws the valve wide open. No throttling effect occurs, and it is claimed that wire drawing is eliminated. The trap is said to handle all ordinary oil and dirt without clogging.—*Armstrong Machine Works, Three Rivers, Mich.*

• • •

Mobile Crane

Although only one operator is required, a new Unit 1020 ¾-yd. crane mounted on a three-axle undercarriage provides a complete unit. Travel brakes

are air-operated, while the steering is by means of hydraulics.

This 10-ton capacity mobile crane, easy to maneuver, has a four-speed transmission, ranging from less than 1 mile up to 8 miles per hour.—*Universal Unit Machinery Corp., Milwaukee 1, Wis.*

• • •

Metal Etcher

Suitable for marking metal tools with numbers, sizes and other important information, a new etcher comes in 4 and 2 oz. sizes. Depth of mark is controlled by etching heat and speed writing. The heats are 120, 240, 420 and 700 watts.

Some special features of the etch include a red indicating lamp, protect 4-heat switch, and a renewable wo plate. All parts are enclosed in a co pact case. Total weight is 16 lb.—*Ide Commutator Dresser Co., 1368 Pa Ave., Sycamore, Ill.*

• • •

Water Meter Prover

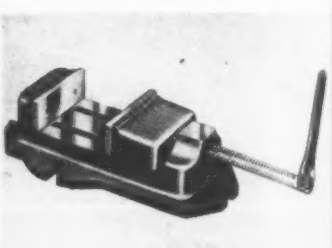
Constructed to conform to the ide and needs of practical meter maint nance men, a new water meter prover said to be accurate, accessible, and ea and fast to use. It will test meters u to and including the 2-in. size; flo rates are determined by an inbuilt i dicator calibrated for flows of $\frac{1}{16}$ 160 gpm.

The prover has a two-compartme cylindrical tank with dual percentag of-error adjustable scales, graduated read at four points. Nordstrom lubr cated plug valves control the flow.— *Pittsburgh Equitable Meter Co., Pitt burgh 8, Pa.*

• • •

Heavy Duty Vise

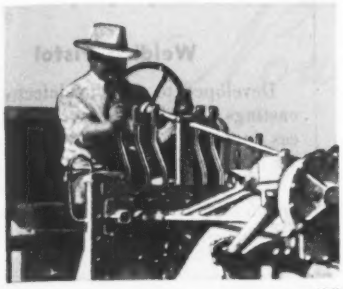
Precision built for heavy duty an to withstand vibration, the Jenkins Ba Lok vise is 3½ in. high with jaws 1⅝

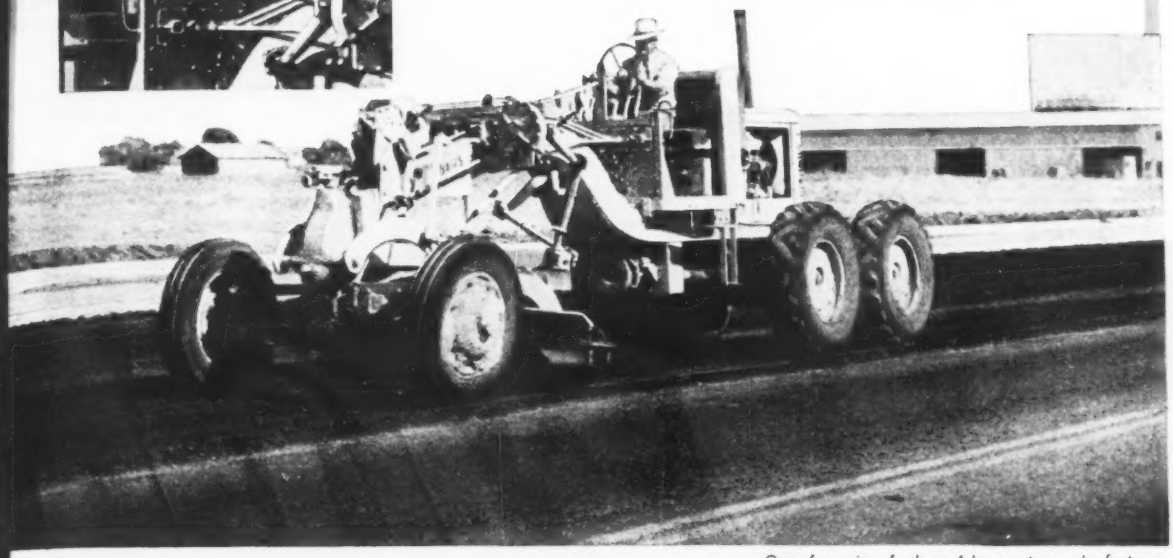


4¼ in.; its 4-in. opening is said to b equivalent to an ordinary 6-in. vise.

The vise is set and released by push-pull pressure unit, which has pos

YOU GET *Speedy and Positive Controls* ON ADAMS MOTOR GRADERS





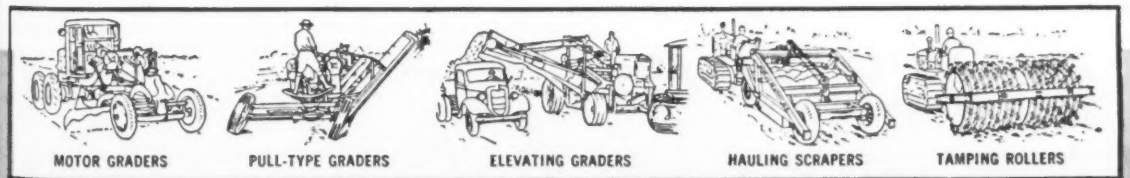
One of a series of ads on Adams motor grader features

EXPERIENCED grader operators—particularly those on construction work where frequent blade adjustments are necessary—want positive, dependable controls. When they operate their control levers they want to know what's going to happen and how fast . . . When you lower the blade on an Adams, it goes down at a constant, set speed and when you raise the blade it comes up at the same constant speed. The same positive action applies to the scarifier and leaning of the front wheels. And, with Adams mechanical controls you can operate two or more controls at the same time without affecting the set speed of any of them . . .

Positive acting controls are essential on fine work, such as the blading of black top on the contract job pictured above, but they are advantageous also on all types of grading and road maintenance. You want them and should have them whether you are contractor or highway official, so be sure of getting them by buying Adams . . . Not only are Adams controls positive and dependable in their action but they are speedy and easy to operate.

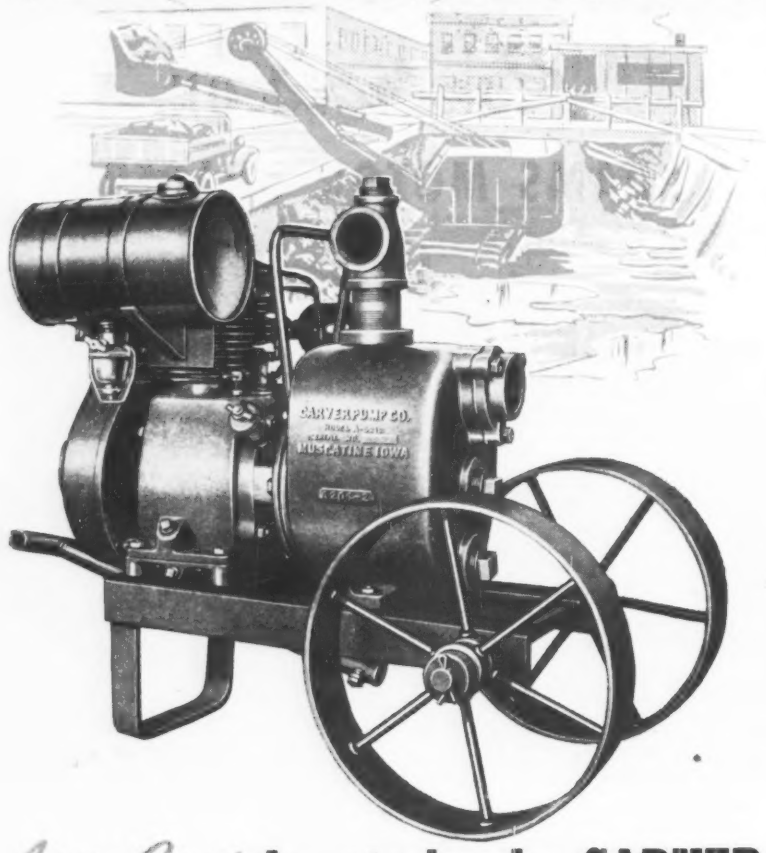
J. D. ADAMS COMPANY · INDIANAPOLIS, IND.

At war's end we'll need many new roads and many jobs for returning service men. Plan post war projects now and meet both needs.



ADAMS ☆ ROAD-BUILDING AND ☆ EARTH-MOVING EQUIPMENT

in the foreground of tomorrow's
Foundation Construction Feature—

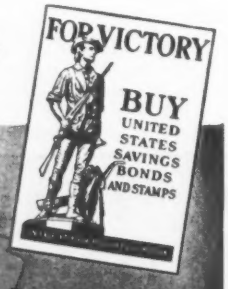


Low Cost **dewatering by CARVER**

Whether you're dewatering from a sump or with a well-point system, you'll need a tough, rugged CARVER to handle the sandy, gritty water without clogging or excessive wear. CARVERS have shown savings as high as $40,000 in dewatering costs on a single excavating job. Savings will be important on tomorrow's closely-bid jobs.

When the time for your next job arrives, remember that you can insure your profits with a Carver, certified to go to work at once and keep on working. Get the facts—see your nearby CARVER distributor, or write us for a copy of the CARVER catalog, *now.*

THE CARVER PUMP CO.
MUSCATINE, IOWA



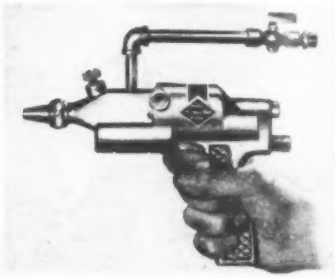
CARVER CENTRIFUGAL Certified PUMPS

tive 4-point locking contact, and will develop pressure up to 20,000 lb. Only a quarter turn of the handle is needed to lock and release.—*Mechanics Engineering Co., Jackson, Mich.*

• • •

Welding Pistol

Developed to reclaim defective metal castings, the Mogul Nervous Weld process includes a pistol requiring 60 lb. air pressure at 4 to 5 cu. ft. per minute, and a machine, 110, 220, 440 volts, 60 or 25 cycle, single phase. The pistol deposits atomized particles of metal



which are welded to the surface and pressed, leaving a metal which is welded and forged.

Aluminum, bronze or nickel rod is manually fed through the pistol by a trigger control. The pistol is said to eliminate stresses and distortion; the temperature never rises above 125 deg., yet the deposit is so dense at point of fusion that there is no apparent line of demarcation.—*Metallizing Co. of America, 1330 West Congress St., Chicago 7, Ill.*

• • •

Worm Gear Reduction Unit

A new type of double wall construction is the basis of the cooling system in the Speedaire worm gear reduction unit. This provides an air passage completely enveloping the oil reservoir in which the gear operates; the inner wall, deeply finned on the air side, increases the heat-dissipating surface.

An exhaust fan, operating with either direction of rotation, draws air through the space between the walls at high velocity. Because of lowered operating temperature, the Speedaire is said to have a large load-carrying capacity.—*Cleveland Worm and Gear Co., Cleveland, Ohio.*

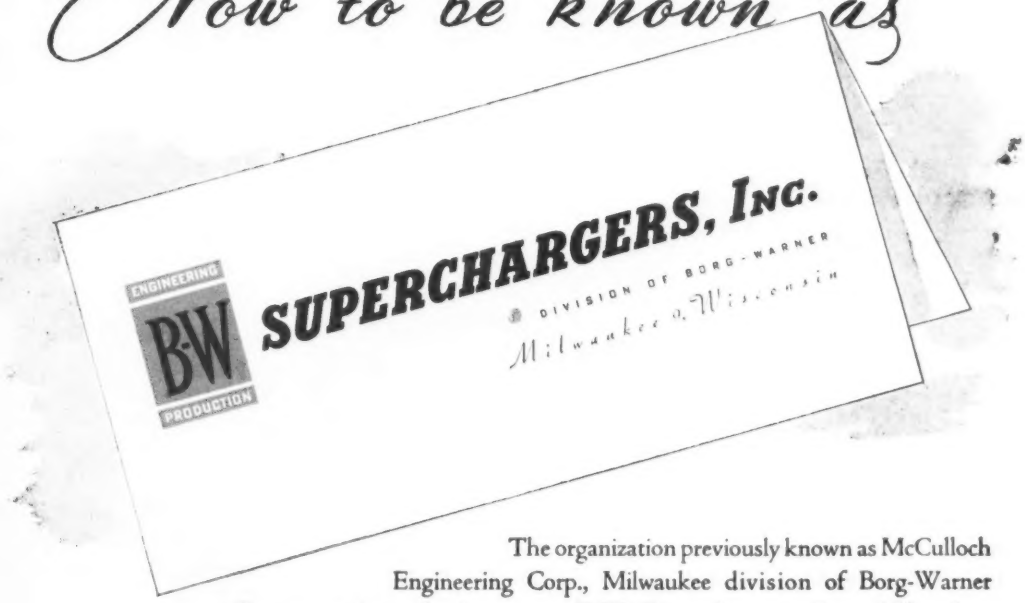
• • •

Emergency Sheer Plate

Quickly replaceable, a new emergency shear plate is a safety improvement against roll breakage on aggregate crushers. Under ideal working conditions, heavy helical springs of chrome

McCULLOCH ENGINEERING CORP.
MILWAUKEE

Now to be known as



The organization previously known as McCulloch Engineering Corp., Milwaukee division of Borg-Warner Corp. now is to be known as B-W Superchargers, Inc., Milwaukee.

This change of name is intended to emphasize the fact that this company will continue to specialize and concentrate on the production of superchargers for internal combustion engines for transport, stationary, construction equipment and other services.

The modern plant of the former McCulloch Engineering Corp., on Capitol Drive, Milwaukee was originally designed, built, and equipped for the manufacture of superchargers. Ir. response to wartime demands it has supplied superchargers in volume numbers for military installations of all kinds. When peace returns B-W Superchargers, Inc., will continue to build superchargers for increasing the power of gasoline and diesel engines of the future.

Because it is more indicative of its principal activity — the design, development and production of superchargers — the change of name has been made.

ENGINEERING
B-W
PRODUCTION
SUPERCHARGERS, INC.
DIVISION OF BORG-WARNER
Milwaukee 9, Wisconsin
formerly McCulloch Engineering Corp.

HEIL
Hydraulic
Bulldozers and
Trailbuilders

are helping to speed Victory on the fighting fronts of the world

— because of their ability to push through when the going is tough

These efficient, dependable, Heil Bulldozers and Trailbuilders, are built to work as a smooth-operating unit with Cletrac Tractors.

Heil engineers have pioneered the modern practice of replacing heavy cast members with welded box sections that are lighter, stronger, and easy to repair in the field without costly delays. Sound engineering design, reduced to the utmost simplicity, guarantees few service interruptions and cuts maintenance costs.

Balanced loads, backed by full length crawler drive, result in effective digging and dirt-moving performance, plus big savings in maintenance costs on both blade equipment and tractor.

Enjoy maximum work and satisfaction with a Heil Bulldozer — designed to move "pay dirt" quickly, easily and economically.

R-34

See your Cletrac Tractor Distributor

ARMY E NAVY THE HEIL CO.
GENERAL OFFICES • MILWAUKEE 1, WISCONSIN

vanadium steel maintain proper tension on the floating roll and keep a constant opening; when uncrushable foreign material is introduced, the springs protect the roll by relieving undue stress, and prevent breakage. If such material passes into the rolls, shear plates of 11-gage sheet iron at the butt of the springs snap and free the springs completely.

Any large piece of uncrushable material would cause the nut, slotted for and holding the shear plate, on the end of the adjustable screw bolt, to shear the plate and allow the unrestrained bolt to pass through the spring and instantly release all tension on the floating roll. To resume operation it is only necessary to replace the shear plates.—*Iowa Manufacturing Co., Cedar Rapids, Iowa.*

• • •

Plastic Goggles

Providing a close, comfortable seal around the eye orbits, new all-plastic goggles, "Looks," have large aviation-type lenses for a wide angle of vision. The General Purpose model has direct

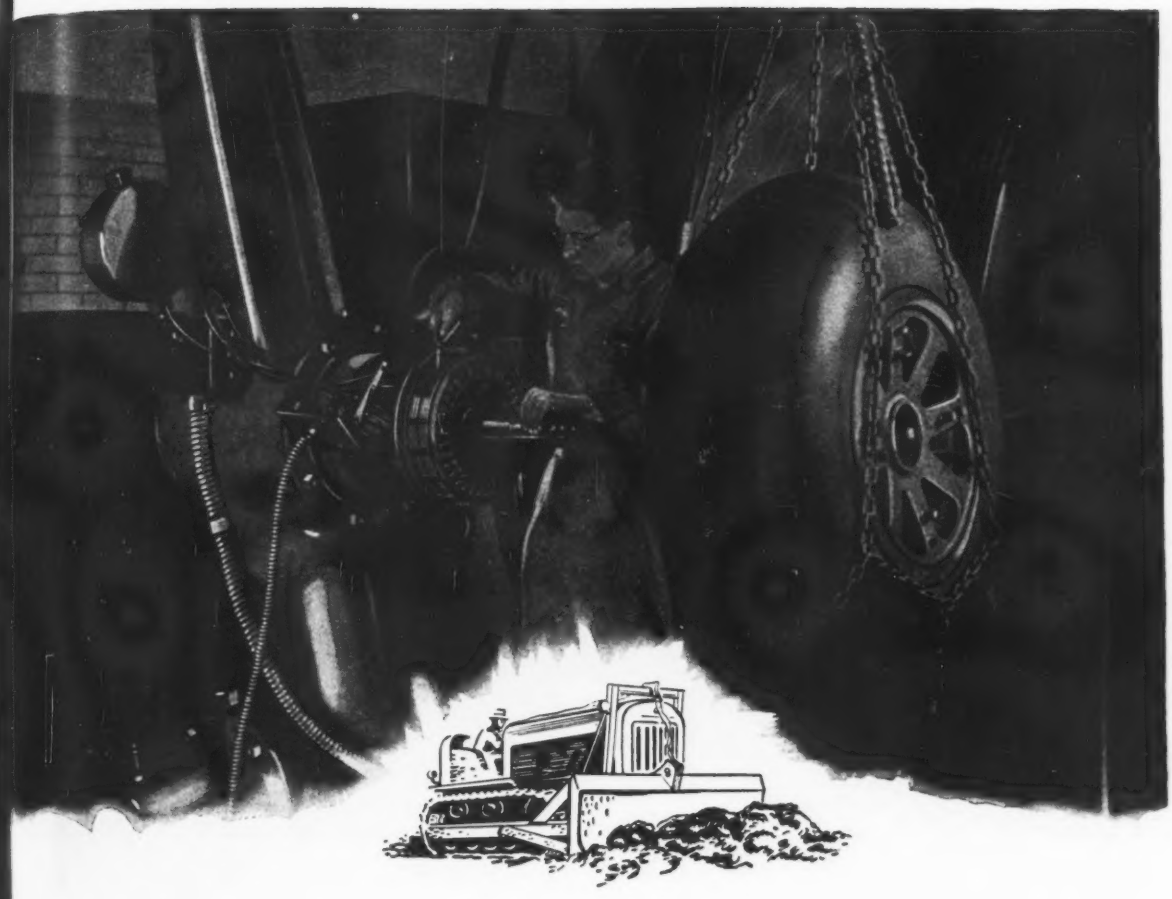
ventilation through holes at the top and bottom of the eye cups; the Dust model has indirect ventilation through serrated lens seats.

Clear or green in color, the lenses are of polished sheet acetate. A wide elastic headband holds the goggle in place.—*Mine Safety Appliances Co., Braddock, Thomas and Meade Sts., Pittsburgh 8, Pa.*

• • •

Low-Pressure Gage

So sensitive that it will register pressure exerted by a head of 0.02 in. of water, a new gage is said to possess a number of novel features. This instrument, sensitive to one part in 500, and accurate to one part in 300, eliminates backlash; it covers a pressure range as

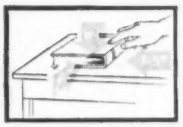


Back of every Velvetouch·Installation . . .

Behind each Velvetouch clutch facing and brake lining are years of leadership in developing powdered metal friction materials . . . plus the facilities of a well equipped laboratory devoted exclusively to the study of pairs of *rubbing surfaces.* Modern science and engineering skill can produce no finer friction materials than Velvetouch for brake and clutch replacements in tractors, power shovels and other earth-moving equipment.

THE S. K. WELLMAN COMPANY
1374 EAST 51st STREET • CLEVELAND 3, OHIO

Interesting facts about *Friction*

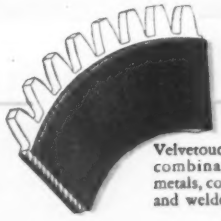


The coefficient of friction (f) of a book sliding across a table top is easily determined by dividing the weight of the book (W) by the amount of force required to slide the book (F).

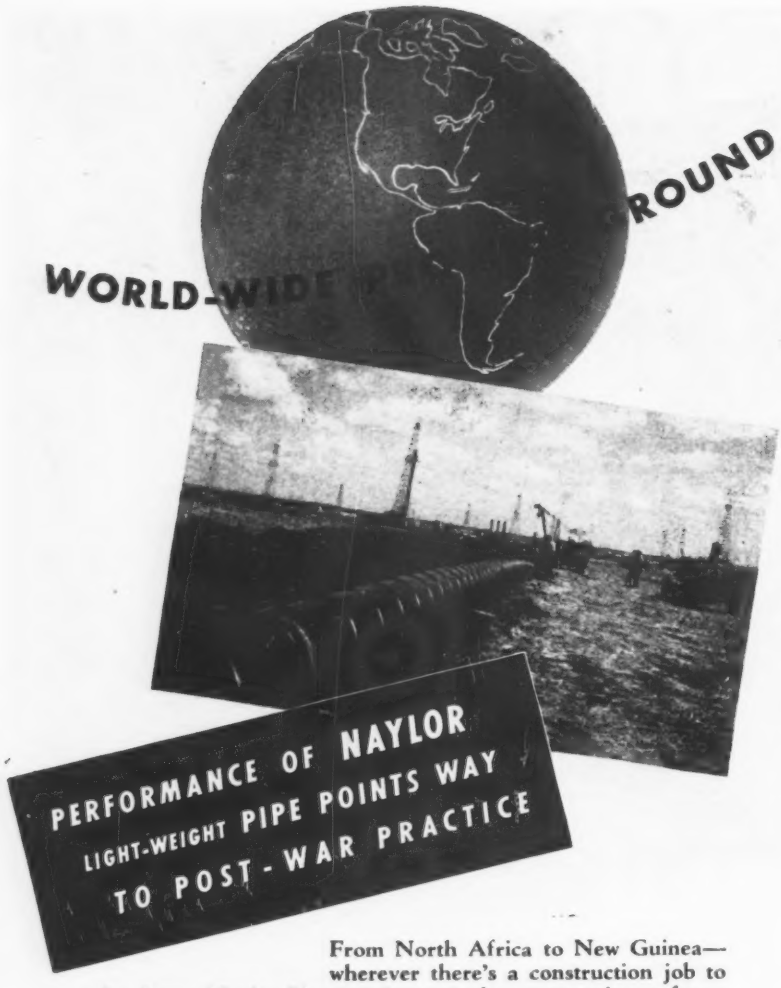
Because many factors affect the coefficient of friction, i.e. speed, pressure, temperature, etc., it is impossible for any material to have a uniform coefficient of friction under all operating conditions.

The powdered metals in Velvetouch are combined in a wide variety of "mixes" to give the best possible coefficients of friction for each installation.

For Brake and Clutch . . . Use Velvetouch



Velvetouch is *all metal* — a combination of powdered metals, compressed, sintered and welded to a solid steel backing.



From North Africa to New Guinea—wherever there's a construction job to be done—Naylor Pipe continues to demonstrate its performance advantages over ordinary light-weight pipe.

Through its exclusive Lockseam Spiralweld structure, this pipe gives you greater strength, leaktightness and safety to perform jobs normally requiring heavier-wall pipe. And along with these advantages, Naylor offers advanced methods of pipe line connection in simplified and far quicker coupling.

All these performance features can step up your construction work in the post-war period just as effectively as in war-time construction.

USE NAYLOR PIPE

for Dredging • Hydraulic Sluicing • De-Watering
Ventilating • Exhaust and Intake • Gas Gathering
Pulp Lines • Vacuum Lines and other high or low pressure lines

Naylor

NAYLOR PIPE COMPANY

General Offices: 1248 E. 92nd STREET, CHICAGO 19, ILL.

New York Office: 350 Madison Avenue, New York 17, New York

low as 10 inches of water; the 330 degree scale may be calibrated to meet any need.

Gages are available with an expanded scale at lower pressures and a contracted one at higher pressures. A compound instrument measuring both vacuum and pressure is also available. Connections are provided for either ⅛-in. pipe or ¼-in. hose.—*Wallace & Tiernan Products, Inc., Belleville, N. J.*

• • •

Outdoor A-C Welders

Protection of all openings from weather conditions, is a leading feature of two new outdoor A-C welders. The 500-amp. welder, with a current range of 100 to 625 amps, and the 300-amp. welder, with 60 to 375 amp. current, are equipped with "idlematic" control,

which reduces output voltage to less than 30 volts when the arc is not in operation.

A sealed window prevents dust and moisture from entering the current indicator; the ventilating openings in the welders shed water and keep air velocity low. All internal parts have a special finish to protect against corrosion.—*Electric Welding Division, General Electric Co., Schenectady, N. Y.*

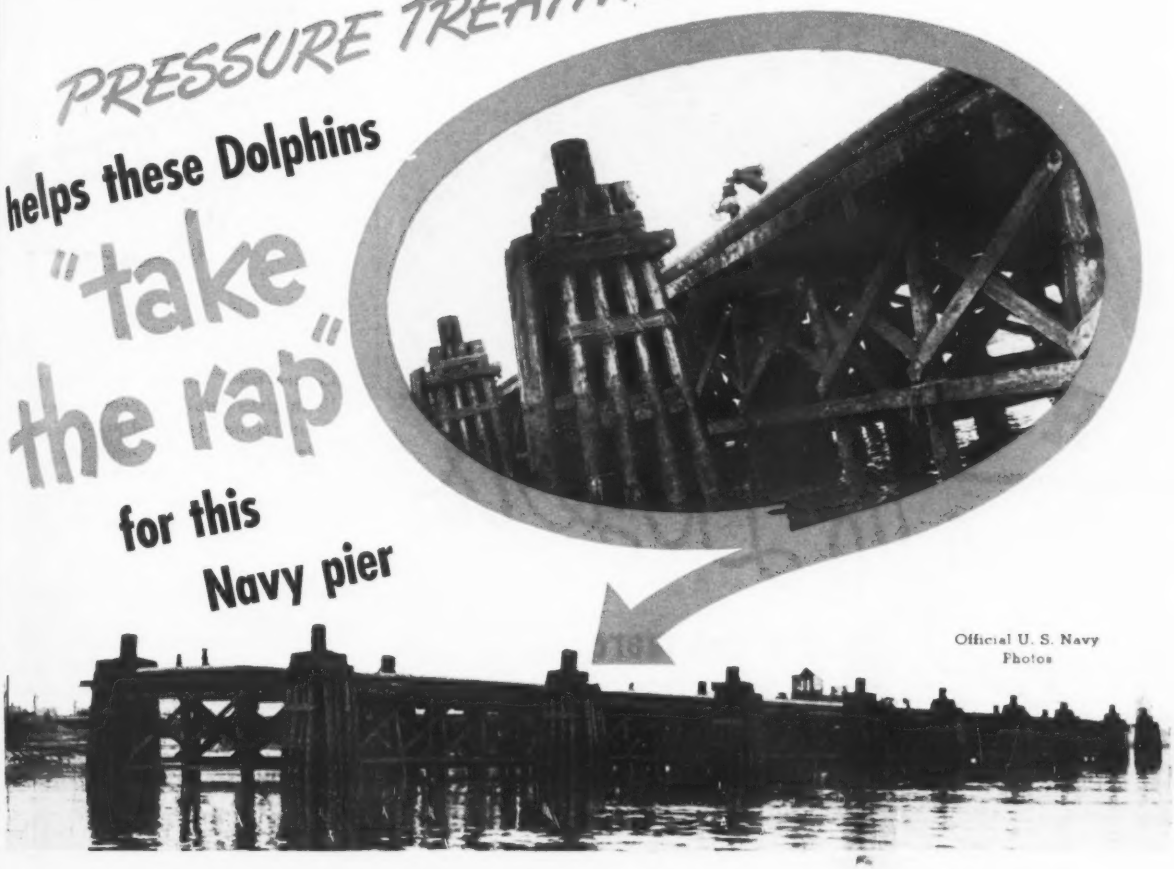
• • •

Two Rust Preventives

Excellent penetration and protection are afforded by two new rust preventives, the manufacturer states. "Cyclodiene," which films dry in about 20 minutes, leaves rust-inhibited clean surfaces for a short time; "Percyclodiene" films will remain for about 30 days.

Both of these metal-cleaning solvents are used as short time simple immersions at room temperature, in an open tank. Neither will attack metals. Free samples are available to industrials.—*Technical Processes Division, Colonial Alloys Co., Philadelphia, Pa.*

PRESSURE TREATMENT helps these Dolphins "take the rap" for this Navy pier



Official U. S. Navy Photos

The U. S. Navy protects the Nation against one submarine menace, but pressure-treatment protects the Navy against another . . . the destructive marine borer. The dolphins that guard this fueling pier against injury from docking ships are heavily impregnated with creosote.

Each dolphin is a cluster of Fir piles, 65-75 ft. long, with 7-in. tips and 13-in. butts, pressure-treated with #1 grade creosote to a net retention of 14 lbs. per cubic foot. They are detached from the pier structure, so that no shock will be transmitted to it.

The importance of dependable protection against marine borers is suggested by the fact that the damage in Boston Harbor alone was not long ago estimated at $5,000,000 for a 3 year period. Experience indicates that pressure-treatment with creosote provides effective and lasting defense.

Marine applications like this are only one of hundreds where pressure-treated wood is cutting costs and extending structural life for users. A number are illustrated and described in our bulletin, "Economical and Permanent Construction with Pressure-Treated Wood." Would you like a copy? Just write the address below, and we will send you one.

KOPPERS COMPANY • WOOD PRESERVING DIVISION
PITTSBURGH 19, PA.

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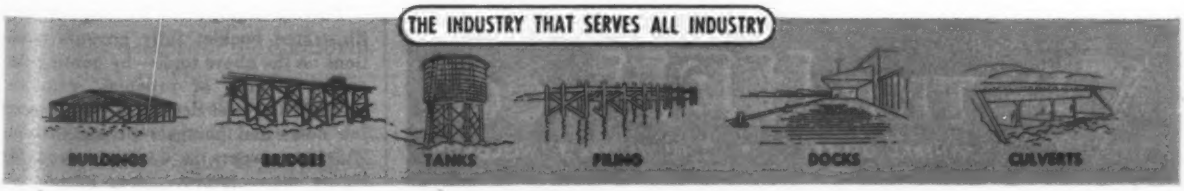
THE INDUSTRY THAT SERVES ALL INDUSTRY



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Cable Dozers

you get more penetrating power at the blade . . . more yardage

Enjoy dependable, low-cost operation — move "pay dirt" economically

Heil Cable Dozers are doing an outstanding job in clearing the way for our armed forces. Just as you have profited by top-notch Heil performance in your earth-moving jobs, so do the Army engineers in their efforts to move dirt as quickly as possible with a minimum of delay for service and maintenance.

With Heil Cable Dozers, you get more drive — more penetrating power at the blade so that you can move more "pay dirt" with each load — quickly — economically. You get a clean-cut job — you can cut at a desired depth—accurately and smoothly. End-tilt adjustments and blade-angling are quickly and easily made.

Heil Cable Dozers are engineered throughout for "tops" in performance and savings for your pocketbook. You're money ahead when you specify Heil Cable Dozers.

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ARMY E NAVY

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Contractor's Hoists—An illustrated bulletin gives details of general purpose and contractor's types of hoists, including derrick hoists for hook and grab bucket work with and without swinging gear, separate swinging hoists and barge derrick hoists.—*Lidgerwood Mfg. Co., Elizabeth-B, N. J.*

Non-skid Flooring—An easy way to apply, long wearing, plastic material that sticks to practically any surface and imparts a skid-proof walking or working area whether dry, wet, or covered with oil emulsion, is described in an illustrated 4-page bulletin.—*Truscon Laboratories, Caniff & G.T.R.R., Detroit 11, Mich.*

Belt Conveyor Equipment—This catalog No. 60-B contains 160 pages of information for the belt conveyor user and the designing engineer. It covers specialized data regarding the application of belt conveyors for the handling of materials, together with a listing of belt conveyor equipment. Included are charts and tables to help in the choice of proper units for any specific service and location.—*Webster Manufacturing, Inc., Tiffin, Ohio.*

Production for War—The foregoing is the title of a 32-page booklet which tells how this manufacturer's units—concrete mixers, portable compressors, concrete breakers, pavers, tampers, rock drills, and other air-powered construction tools—are performing a service no less vital to the war program than that of its more spectacular torpedo-charging compressors aboard warships.—*Worthington Pump and Machinery Corp., Harrison, N. J.*

Postwar Equipment Buying—A fact-illustrated booklet fully answers questions on the above topic—by quoting the record number of products manufactured in the past decade, by presenting job notes and photos representative of 252 fleet owners in 48 states, and by listing many improvements introduced

HOW *Pan American Airways* PACKS 2,100 HOURS INTO A DAY

THE minute the giant transatlantic Pan American Clippers get back to their base, they get an exhaustive going over.

It's thorough. And it's fast.

A swarm of mechanics, working in eight-hour shifts, get the job done in 60 hours — 2,100 man-hours a day.

What helps this swift turn-around are Elastic Stop Nuts. These nuts have been on every Pan American Clipper since 1928. They are on motors, mounts, wings and countless structural parts.

Particularly timesaving are the Anchor Nuts which permit smooth blind mounting. Hundreds of these fasten the covers for inspection openings. These Anchor Nuts* are an Esna development and are used by millions in all kinds of airplanes.

Elastic Stop Nuts lock tight and fast without any auxiliary devices. There's no time wasted in fussing to get them off and back on again.

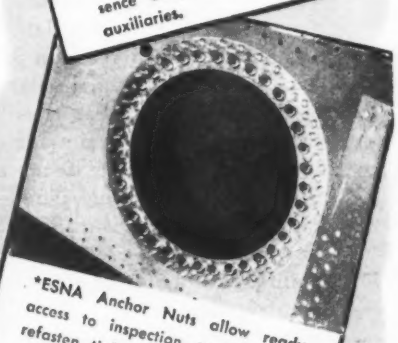
They lock because of the elastic collar in the top. This collar squeezes in between the bolt threads. It's compressed tight. The nut can't turn. It can't wiggle. It can't shake loose. And you can take it off and put it on again many times and it still locks.

Every fastened product can be better because of these nuts — can be safer, tighter, quieter, and longer lasting.

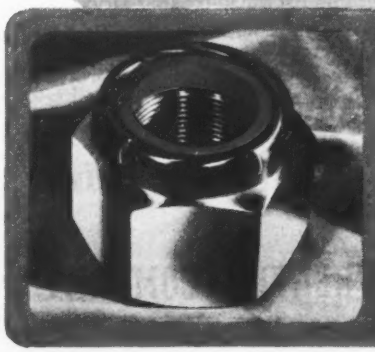
So if you have a fastening problem now, or see one ahead, let us show you how these red-collared Esna Nuts can help. Our engineers are ready to consult with you and recommend the appropriate nut.

LOCKED ON THE BOLT BY THE ACTION OF THE GRIPPING RED COLLAR.
THE COLLAR IS ELASTIC, THE NUT CAN BE USED TIME AND TIME AGAIN.
MADE IN ALL SIZES AND TYPES — WITH THREADS TO FIT ANY STANDARD TYPES OF BOLTS.

The Clippers' powerful engines are equipped with Elastic Stop Nuts. Overhauling is simplified by the absence of pins, washers, or other auxiliaries.



*ESNA Anchor Nuts allow ready access to inspection openings, yet refasten tight and strong to carry stressed skin loads.



ESNA

TRADE MARK OF
ELASTIC STOP NUT CORPORATION
OF AMERICA

ELASTIC STOP NUTS

Lock fast to make things last

UNION, NEW JERSEY AND
LINCOLN, NEBRASKA

Permanent wood bridges have now largely replaced the temporary crossings on the Alaska Military Highway. Fabricated and treated hundreds of miles from the sites where they were to be set up, the connector-built bridges saved considerable time and labor on installation. Because the wood is deeply impregnated with Wolman Salts* preservative, these bridges also promise to keep maintenance low throughout the years.

Wolmanized Lumber* has been successfully employed for many years by the railroads and highway departments as a means of combatting decay and termite attack. The Public Roads Administration pioneered in the prefabrication of bridges before the war. Savings of time and labor in erection and on upkeep of prefabricated, Wolmanized Lumber bridges point to wide use of standardized bridges in postwar road construction.

Wolmanized Lumber is vacuum-pressure impregnated under strict technical control, assuring dependability. Now, of course, most of the lumber we treat is for military uses. But plan on gaining the advantages of this pressure-treated wood in your postwar construction. American Lumber & Treating Company, 1649 McCormick Building, Chicago 4, Illinois.

*Registered trade marks

WOOD THAT'S Alloyed FOR SAFETY AND ENDURANCE

AMERICAN LUMBER & TREATING COMPANY

in the earthmoving and construction industry by this manufacturer.—*R. G. LeTourneau, Inc., Peoria, Ill.*

Luminescence—A booklet gives a clear picture of luminescence by discussing in simple language the characteristics, properties, limitations and applications of the inorganic luminescent pigments, as well as the terms applicable to this industry. A number of simple tables and charts are included to illustrate such terms as "the dark-adapted eye" and "the decay of afterglow."—*The New Jersey Zinc Co., 100 Front Street, New York, N. Y.*

Soldering, Brazing and Welding—Plant personnel, managers or engineers who have to deal with problems in maintenance or production welding should be interested in this 4-page folder. It tells what happens when the welding alloy is deposited on the parent metal at low temperatures. It gives various definitions concerning the welding process. Welding supervisors may obtain limited supplies to distribute to their workers. — *Engineering Dept., Room 1113, Eutectic Welding Alloys Co., 40 Worth Street, New York 13, N. Y.*

Adhesion and Coating—A booklet helpful to anyone using adhesives or coating materials, impregnators, spray-on insulators and sound-deadening compounds is ready. It lists various formulae and shows the viscosity, bonding range, method of application, etc.—*Minnesota Mining and Manufacturing Co., Saint Paul 6, Minn.*

Electronic Weld Timer-Contactor—A technical bulletin details specifications, features, and applications of new combination timer-contactor "package" units designed to provide automatic electronic control for resistance welders. According to the bulletin, use of these timer-contactors relieves the welding operator of the timing operation and in addition virtually eliminates all burned welds due to the accuracy with which this device controls electrode movement and pressure and also the duration and intensity of the weld current.—*Weltronic Co., 19500 West 8 Mile Road, Detroit 19, Mich.*

High and Low Pressure Gaskets—In this catalog are described gaskets for pressures from 10 psi to 3500 psi, the gaskets including all types for power, municipal, chemical and industrial installations. This manufacturer's method of spiral wound construction involves the winding of a single strip of metal ply, preformed into a U-shaped groove. Between each metal winding are inserted two parallel thicknesses of asbestos filler. An air space, designated as

WELCOME BACK Empire STREEEMLINE BRONZE CASE METERS

Amendment to W. P. B. Order L-154 Permits Resuming Manufacture of these Superior Bronze Case Meters.

YES, Empire Streeemline Meters are again in production—welcome news to the many water meter buyers who preferred to defer purchases until bronze cases could be made available. And, these—the most modern of today's meters—embody even more refinements than their pre-war predecessors. For we have learned, as we have worked for Victory, new ways to make better meters.

Empire Streeemline Meters are of the oscillating piston type—a design principle that over a 60 year span has earned an enviable reputation among water works' men for extreme accuracy, long life, and low cost of maintenance. In the Streeemline, scientifically proportioned measuring chambers extract the ultimate in precision from perfectly balanced pistons. Smooth interior flow contours and measuring chambers with dual inlet and outlet ports keep pressure absorption at the absolute minimum. Balance and careful fitting reduce friction and wear, assuring retention of the high initial accuracy, over a long period of time.

Now A Complete Domestic Line

Our engineers have expanded the EMPIRE Streeemline design, during the war interlude, to provide complete coverage of all domestic requirements. We are now in production on all sizes from ⅝ inch through 1 inch and can make prompt deliveries on orders received. Revised literature on the complete line of EMPIRE Streeemline Meters is now available and will be sent upon request.

AVAILABLE *NOW!*

IN SIZES ⅝ INCH THRU 1 INCH

PITTSBURGH EQUITABLE METER CO.

MERCO NORDSTROM VALVE CO.

Main Offices, PITTSBURGH, PA.

Atlanta, Brooklyn, Chicago, New York, Boston, Buffalo, Columbia, Houston, Kansas City, Los Angeles, Pittsburgh, San Francisco, Seattle, Tulsa

National Meter Division, Brooklyn, N. Y.

PITTSBURGH-NATIONAL Water Meters

a Breather

FOR HOT PLANES AND MEN

Heat — 140 degrees, and more — maintenance crews in plane interiors, oven hot. Portable ventilating units, powered by gasoline engines, bring relief — draw hot air out, or shoot cool air in — one more war job for dependable Briggs & Stratton 4-cycle air-cooled gasoline engines.

Air-Cooled Power

4 CYCLE BRIGGS & STRATTON GASOLINE ENGINES

During 25 years of *continuous* production Briggs & Stratton has built more than 2,000,000 air-cooled 4-cycle gasoline engines. We are now well started on the 3rd million. Their trouble-free performance, easy starting and economy have made Briggs & Stratton leaders in the field—"preferred power" everywhere. BRIGGS & STRATTON CORPORATION, Milwaukee 1, Wisconsin, U. S. A.

a "breather-space," between each thick ness of these asbestos strips is preserve in order that the gasket may expand an contract in relation to internal pressur changes. The metal ply acts as the seal ing member of the gasket.—*United States Gasket Co., 1534 Pierce Avenue, Camden, N. J.*

Lathe Catalog—An 8-page, file siz catalog illustrates and describes engi lathes, toolroom lathes, and precisio turret lathes for practically all types o production, toolroom, and maintenanc work.

All information concerning capa ities, speeds, feeds, and dimensions tabulated for each size and model. Co siderable space is devoted to lathe a tachments for special classes of wor —*South Bend Lathe Works, South Ben 22, Ind.*

Hydraulic Presses—A reprint revea the modern trend in the press-workin of metals. It points out that sheet met drawing and forming, forging, powd metallurgy and metal die casting all r quire heavy pressures, which it is sai can be most efficiently applied by th self-contained all-hydraulic press.—*Th Hydraulic Press Manufacturing Co Mount Gilead, Ohio.*

Installation Views—An attractive page pictorial brochure, entitled "Fro Foundation to Flagpole," featuring co struction and maintenance of building of various types and design from moder industrial plants to homes and apar ments, has just been issued.

More than 25 photographs in th booklet depict commercial, educationa industrial and other buildings, includin utilities, hospitals and churches. A companying each photograph are th names of the architects and contractor —*Building Products Division, L. Sonn born Sons, Inc., 88 Lexington Ave., Ne York 16, N. Y.*

Shovels and Cranes—A booklet sho some of the pictorial data accumulat on what shovels and cranes are doi for the Army and Navy in combat zo and overseas theaters.—*The Th Shovel Co., Lorain, Ohio.*

Meters—A bulletin describes a me which offers several new, improved fe tures including Venturi design.—*Bai ers-Providence, Inc., Providence, R.*

Bolts, Nuts and Screws—An 180-p volume contains a collection of practi discussions on engineering, design a production of headed and thread products. Compiled by A. E. R. Peter with a score or so of other experts c tributing.—*The Lamson & Sessions C Cleveland, Ohio.*

A REPORT OF PROGRESS

SYNTHETIC RUBBER

INSULATIONS AND SHEATHS ON SIMPLEX WIRES AND CABLES

During the past few months a new synthetic rubber compound has been developed to replace each special purpose, natural rubber insulation and sheath that has been used on Simplex wires and cables. The results seem miraculous but they are not the result of wishful thinking or crystal gazing. They are solid facts, based on knowledge and skill accumulated during the past sixty years, which make it possible for us to make the most of new insulating materials and do it quickly.

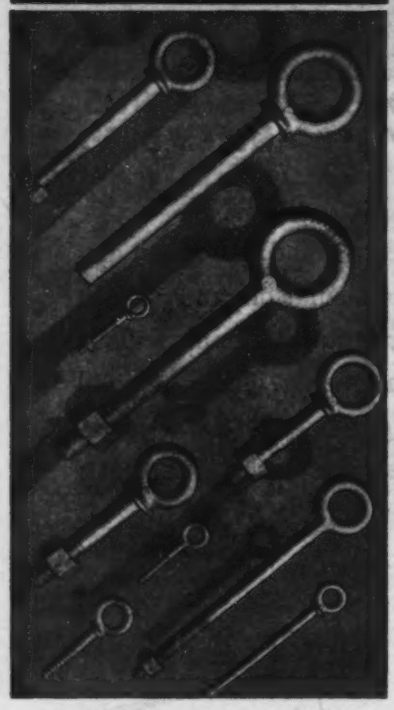
If you use insulated wires and cables for any purpose you will be interested in what we have accomplished with the synthetic rubber insulations and sheaths that are now being used on all Simplex wires and cables. The story is told in an up-to-date booklet entitled "A Report to Industry on Simplex Synthetic Rubber Insulations." It is now being printed and we would like to send a copy to you as soon as it is ready for distribution. A request by postcard or letter to the Simplex representative nearest you or direct to us at Cambridge will have prompt attention.

Simplex Wire & Cable Co., 79 Sidney Street, Cambridge 39, Mass.

Simplex

WIRES and CABLES

SPECIALS WASTE TIME
...TRY LAUGHLIN'S
STANDARD LINE
EYE BOLTS
FOR ALL JOBS



Keep your eye on this picture if you're thinking of having special bolts made up. Every minute counts! Laughlin standard eye bolts will likely fill the bill. All weldless — all drop forged steel. Nut type with extra length threads for extra adjustment. Send for latest Laughlin Catalog showing standard stock eye bolt sizes in nut, screw and rivet types.

Sold Through Oil Field Supply Houses

Look for Laughlin Products in Powers Road & Street Catalog

Write for latest Catalog on Laughlin Industrial Hardware

FORGING A SHARE IN VICTORY

THE THOMAS LAUGHLIN Company
PORTLAND 6, MAINE

Association Elections and Activities

The Connecticut Water Works Association has elected these officers: President, Walter P. Schwabe, Thompsonville; vice president, V. O. Ketcham, Stamford; secretary-treasurer, L. H. Shull, Ansonia; directors, Caleb M. Saville, Hartford; Earl C. Hopkins, Danielson; T. L. Bristol, Ansonia; A. N. Tiffany, Groton; E. A. Minor, New Haven; and D. W. Hall, Bridgeport.

Engineers appointed to a public works planning committee which will work with the North Carolina Planning Board in laying plans for postwar activities include: George W. Kane of Roxboro, highway commissioner and contractor; L. A. O'Brien of Winston-Salem, architect; C. P. Street of Charlotte, contractor; H. A. Yancey of Greensboro, city manager; and R. M. Rothgeb of Raleigh.

Richard M. Kremer, secretary, Kupferle-Hicks Heating Co., has been elected president of the joint council of the Associated Engineering Societies of St. Louis, Mo. F. A. Cooper, Southwestern Bell Telephone Co. was named vice-president, and E. E. Carlson, Powers Regulator Co., secretary-treasurer.

N. B. Garver, bridge engineer for the Arkansas Highway Department, has been elected president of the Arkansas board of registration for professional engineers. Other officers are R. E. Williams, Little Rock, vice president, Vernon E. Scott, Little Rock, secretary and treasurer.

Charles N. Senour, executive assistant to Gen. Max C. Tyler, president of the Mississippi River Commission and division engineer of the lower Mississippi Valley, spoke on "The New Project for Stabilizing and Deepening the Lower Mississippi River," before the Mid-South section of the American Society of Civil Engineers, recently at Memphis, Tenn.

J. W. Ballard, Kansas engineer and secretary of the Kansas contractors' Association, has been elected president of the Kansas State College alumni association, succeeding Wayne Rogler.

The Jacksonville, Fla., chapter of the National Association of Home Builders was recently formed with Joseph W. Davin, president. Other officers are Walter Crabtree, vice president and Charles E. Commander, Jr., secretary-treasurer. Members include William M. Mason, Charles E. Commander, R. C. Buck, Walter Crabtree, Wilson Mu... nerlyn, Bryant Merritt, M. A. Collin... and Joseph W. Davin, all builders.

A. Middleton was recently elect... president of the Contractors' Associa... tion of Victoria, B. C. Other officers include: A. Whiteman, vice-president; P. M. Townsend, secretary-treasurer; H. M. Cowper, W. S. Bartlett, H. Rupe... Brown, A. V. Wilkinson, W. J. Drysdal... A. E. Evans and H. A. Bradley, di... rectors.

Walter Dieffenbaugher became pres... dent of Canton, Ohio, Chapter of th... National Association of Power Engineers at the annual installation of officers July 12. Others installed were Albe... Hamrock, vice president; E. A. Wilso... corresponding secretary; Charles Ba... ler, recording secretary; Albert Rich... ardson, financial secretary; H. C. Fas... baugh, treasurer and Fred Basle... trustee.

A. H. Wieters, director of the divisio... of public health engineering of th... Iowa State Health Department, De... Moines, has been elected to a two-yea... term on the executive board of the Iow... Public Health association. Paul Hause... industrial hygiene engineer of the de... partment, is the new president.

The establishment of a reading roo... containing both theoretical and practi... cal information on the subject of en... gineering is being discussed by the En... gineering Professions Club of Jackson... ville, Fla.

At a recent meeting of District No. ... of the Minnesota Association of Pro... fessional Engineers at Minneapolis for... newly registered engineers from Min... neapolis-Honeywell Co., Northern States Power Co. and other local in... dustries attended as guests. The meet... ing was arranged by Ed. Hutchinso... of the Aluminum Co., C. K. Preus ... the Minnesota State Highway Depar... ment, presided. George Shepard, cit... engineer and member of the Minne... apolis State Board of Registration; H... E. McWethy, valuation engineer, Min... neapolis Street Railway Co.; S. L... Stolte, President of M.A.P.E.; an... Walter H. Wheeler, national directo... of the National Society of Professiona... Engineers, were the speakers.

M. S. Coover, of Iowa State College... Ames, Ia., was elected president of th... Iowa Engineering society at its recen...

TYPICAL DIESEL LUBRICATION PROBLEMS:

3. Ring-Sticking

Ring-sticking usually results from deposits formed by the combination of the residues of oxidized lubrication oil and fuel with fuel soot.

In four separate ways, RPM DELO prevents the formation of these deposits:

1. RPM DELO is manufactured from a carefully selected base oil containing natural inhibitors highly resistant to oxygen. It contains no heavy residues which may be left behind to act as a binder for the fuel soot.

2. RPM DELO contains an added oxidation inhibitor which greatly reduces the rate at which the oil absorbs oxygen.

3. RPM DELO has chemical detergent properties. The compounding material reacts with the oxyacids to render them essentially inert so that they are no longer able to polymerize to form gums and lacquers.

4. RPM DELO has peptizing properties which enable it to maintain soot and oxidation products in suspension in minute particles. This prevents these materials from settling from the oil and forming engine deposits.

RPM DELO, moreover, is non-corrosive to all types of bearings, does not foam and has very high metal adhesion qualities at both high and low temperatures.

RPM DELO is marketed throughout the United States and many foreign countries under the following names: RPM DELO, Caltex RPM DELO, Kyso RPM DELO, Signal RPM DELO, Sohio RPM DELO, and Imperial-RPM DELO (concentrate).

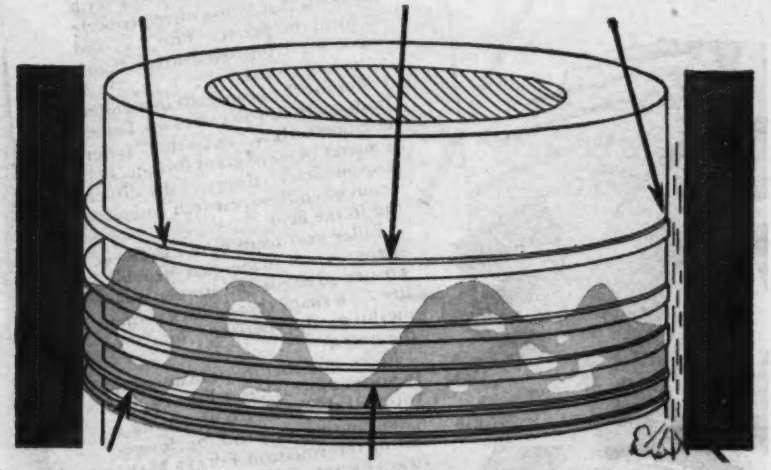
☆ ☆ ☆

HOW RING-STICKING OCCURS

Decomposition products of fuel and lubricating oil deposit in ring groove, behind ring and in side-clearance space.

Rings stick in grooves, no longer expanding to form tight seal between piston and cylinder wall.

With seal broken, hot, high pressure gases "blow-by" stuck ring.



Escape of gases reduces compression, overheats piston, increases oil deterioration.

Blow-by pressure removes lubricating oil from rings and cylinder, leaving dry spots.

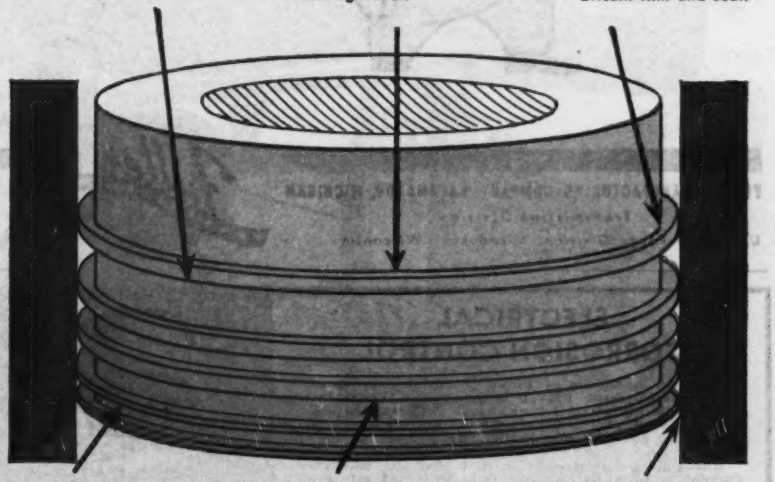
Lack of lubrication results in high ring and liner wear and scratching.

HOW RPM DELO PREVENTS RING-STICKING

Detergent in RPM DELO prevents deposition of oxidation products.

Ring grooves are kept clear, allowing ring tension to maintain tight seal.

RPM DELO clings to ring surface, maintaining lubricant film and seal.



Tight seal eliminates blow-by, maintaining compression and power.

RPM DELO adheres to hot surfaces, protecting entire surface of rings, piston and liner.

RPM DELO lubrication results in minimum ring and liner wear, eliminates scratching.

RPM DELO

STANDARD OF CALIFORNIA

They "BITE" right because
"Occlusion" is the dentist's term for teeth that fit together properly to form the perfect "bite" . . . and if you are so blessed, you can thank your lucky stars.
But for the gear teeth in a Fuller transmission, you can thank Fuller engineers. Here, "occlusion" is not a matter of mere good fortune, but a scientific certainty . . . the direct result of endless research and testing in the field.
Fuller gear teeth have a different shape . . . a shape that provides greater strength and longer wear-life . . . a shape that assures proper meshing—the perfect "bite"—of the gears.
Make sure that the transmission in your new truck is a FULLER, for you will then be sure of getting a quiet running, easy shifting, longer lasting transmission. FULLER MANUFACTURING COMPANY, Kalamazoo, Michigan.
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fifty-sixth annual convention in Des Moines. A. H. Wieters, public health engineer of the state department of health, Des Moines, was named vice-president, and E. F. Behrens, who is with Kenneth R. Brown, consulting engineer, Des Moines, was elected treasurer. A. F. Faul, chief of the Iowa State Testing laboratory, Des Moines, was chosen secretary by the executive committee.

Captain Tom Fenlon of Hunt, Tex., has been re-elected chairman of the Upper Guadalupe River Authority; W. A. Fawcett, vice chairman, and Walter E. Saenger, secretary and treasurer.

Robert L. Coe, vice president of Chase Brass & Copper Co., Inc., Waterbury, Conn., was re-elected president of the Copper & Brass Research Association at its recent annual meeting. Other officers are: vice presidents Wylie Brown, president of Phelps Dodge Copper Products Corp., New York; William M. Goss, vice president of Scovill Manufacturing Co., Waterbury, Conn.; Curtis L. Smith, treasurer of The National Copper & Smelting Co.; Herman W. Steinkraus, president of the Bridgeport Brass Co.; treasurer, C. Donald Dallas, president of Revere Copper and Brass Inc., New York; manager, T. E. Veltfort; and secretary, B. B. Caddle.

George T. Cunningham, Cheyenne, Wyo., was elected president of the Wyoming Engineering Society at its 25th annual meeting recently in Cheyenne. He succeeds Ellis Hudman of Rock Springs. Chas. M. Smith of Thermopolis is the new vice president, and Kirby H. Olds of Cheyenne was reelected secretary-treasurer of the society.

Newly elected officers of the Arkansas Engineers Club, chosen at the recent annual meeting of the club in Little Rock, Ark., are Frank A. Gruver, Little Rock, U. S. Engineers, president; V. E. Scott, Little Rock, Arkansas State Highway Department, vice president; Mike Thomas, Little Rock, Choctaw Culvert Machinery Co., reelected secretary-treasurer; and R. A. Kern, Little Rock, Kern-Limerick, Inc., Little Rock, re-elected steward.

The General Contractors Association, Milwaukee chapter of the Associated General Contractors, elected the following officers at their annual meeting: president, Alfred F. Maier; vice president, Walter T. Buchholz, secretary-treasurer, Arthur C. Wolff; directors: Leo P. Bauer, S. M. Siesel, A. F. Maier, W. T. Buchholz, and A. C. Wolff.

Charles L. Hill, secretary manager of the Nevada chapter of A. G. C., has been appointed a member of a committee of

Cummins Diesel-powered trucks and shovels are a standard combination on major construction, material handling, metallic and non-metallic mining jobs. On the Mesabi Range, for instance, 30 to 40% of the total iron ore output is hauled by truck—the majority of them Cummins-powered.

Late in 1932, the world's first heavy-duty, diesel-powered freight truck went into service. The engine was a Cummins Diesel. Today, Cummins Diesels power approximately 90% of all franchise-operated, long-line, heavy-duty, diesel-powered trucks in the 11 Far Western States.

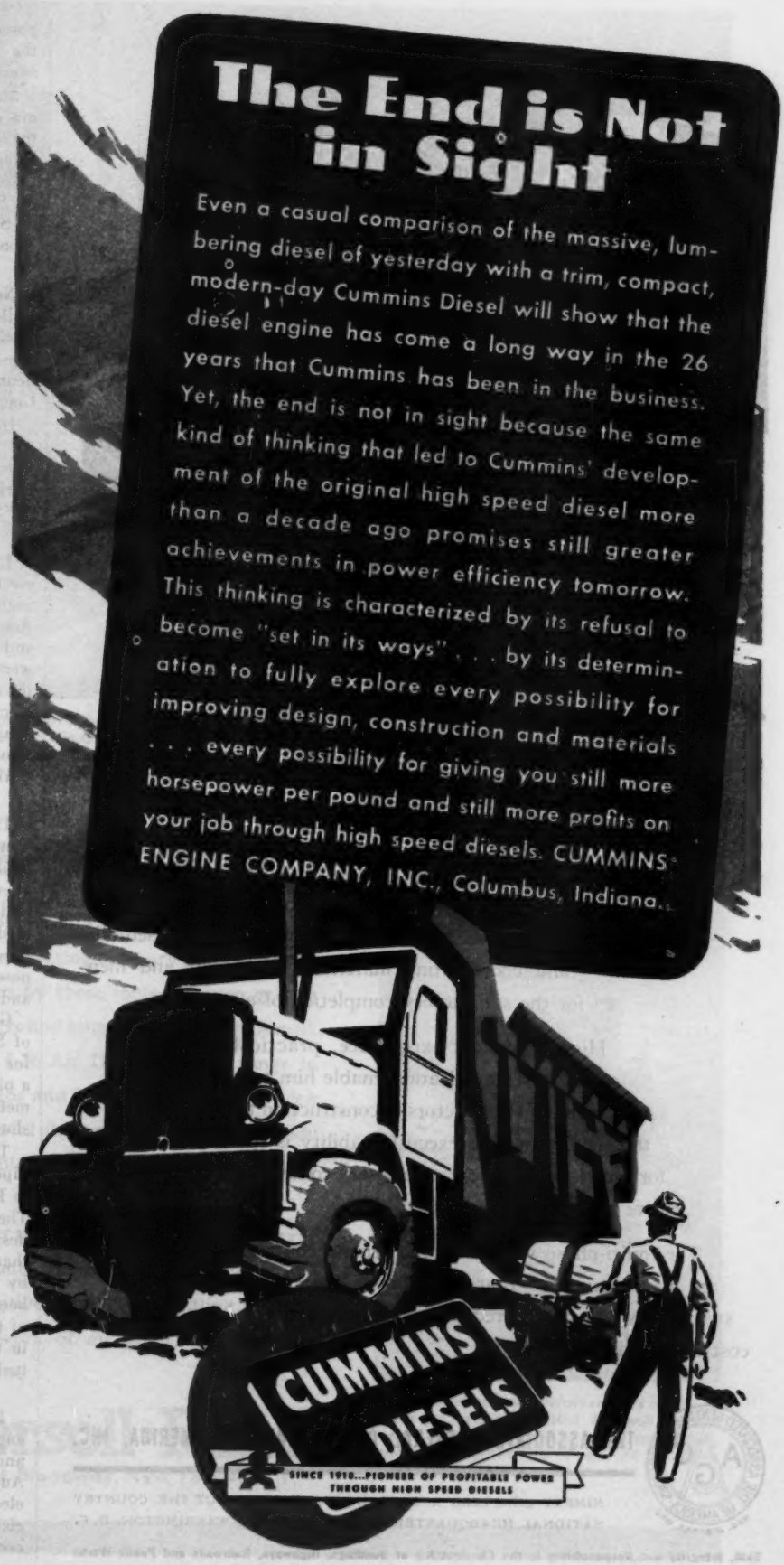
The world's first fully enclosed type marine diesel—now an accepted feature of marine engine design—was built by Cummins in 1928. Cummins Marine Diesels power fishing boats, work boats, pleasure craft and, today, many boats designed for the armed services.

Four Cummins Diesels, three of them seven years old, powered the rig which this year drilled the world's deepest oil well. In this and many other heavy-duty services—logging, construction, and material handling—Cummins Diesels draw the *tough* jobs.

Automotive models • marine engines for propulsion and auxiliary power • power units of all types • stationary engines • generating sets locomotive models

The End is Not in Sight

Even a casual comparison of the massive, lumbering diesel of yesterday with a trim, compact, modern-day Cummins Diesel will show that the diesel engine has come a long way in the 26 years that Cummins has been in the business. Yet, the end is not in sight because the same kind of thinking that led to Cummins' development of the original high speed diesel more than a decade ago promises still greater achievements in power efficiency tomorrow. This thinking is characterized by its refusal to become "set in its ways" . . . by its determination to fully explore every possibility for improving design, construction and materials . . . every possibility for giving you still more horsepower per pound and still more profits on your job through high speed diesels. CUMMINS ENGINE COMPANY, INC., Columbus, Indiana.



The general contractor alone has all the qualifications necessary for the complex job of assembling and coordinating materials, equipment and men for the satisfactory completion of a structure.

His breadth of experience, practical skills and established organization enable him to bring all of the elements and factors of construction together at the right time. His executive ability is specialized for exercising complete supervisory control over the entire construction program.

The multi-phase services of the general contractor are your assurance that a properly "packaged" structure will be delivered at the specified time, cost and quality.

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NATIONAL HEADQUARTERS—MUNSEY BLDG., WASHINGTON, D. C.

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postwar construction being formed by the American Society of Civil Engineers.

Several prominent northern California engineers are already members of the committee. They include: Edward Hyatt, state engineer; Fred J. Grumm, assistant state highway engineer; Robert S. Calland and Henry M. Rich, both of Sacramento, and Asa G. Proctor of Woodland.

New chapter officers of the Mahoning Valley Chapter of the Society of Professional Engineers are: Fred Hubbard, president; R. D. McLean, vice president; A. P. Stoll, secretary and H. D. Coe, treasurer.

Directors are: Mahoning county, W. A. Jenkins and N. R. Porterfield; Columbian county, Arthur V. Smith and Earl H. Newell; and Trumbull county, W. S. Harvey and J. J. Wass.

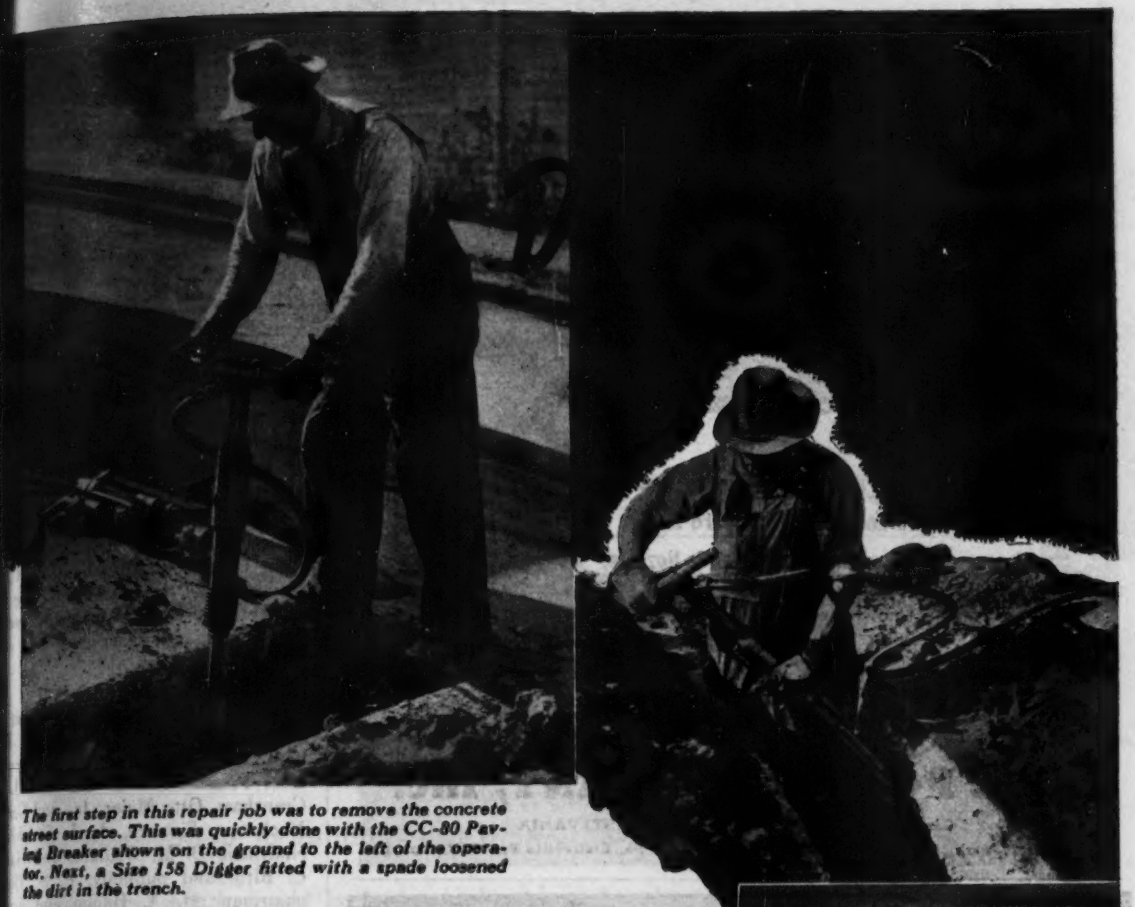
J. M. Brown of Spokane was re-elected chairman of the eastern Washington district of the Western Pine Association recently, and J. F. Grant and M. T. McGoldrich, both of Spokane, were named association directors for the district. The northern Idaho district elected John Rosenberry, of Gibbs, chairman and chose J. L. McCarthy, Orofino, and J. S. Richards, Coeur d'Alene, directors.

The annual meeting of the New York State Sewage Works Association was held in Syracuse, N. Y., recently with about one hundred in attendance. General arrangements for the meeting were made by a committee from the Central New York Section of the NYSSWA composed of Uhl T. Mann, H. H. Wagenhals and J. M. MacCrea as chairman.

Glenn D. Holmes, consulting engineer of Syracuse, described a simple device for making test borings. It consisted of a piece of pipe about 1 to 1½ in. in diameter provided with a point and a slotted opening near the bottom.

This opening is made by cutting the pipe lengthwise for a distance of from 6 to 12 in. and bending out the pipe wall. The device is operated by driving to the desired depth and then rotating it so that an earth core could be picked up by the cut edge of the pipe which had been bent out. This furnishes a sample of the soil at the depth of the opening in the pipe, the sample not being disturbed when the pipe was pulled out.

Philip R. Elfstrom, assistant chief engineer of the Chicago, North Shore and Milwaukee, and the Chicago, Aurora and Elgin Railroads, has been elected president of the Western Society of Engineers, Chicago. He succeeds C. Earl Webb, division engineer



The first step in this repair job was to remove the concrete street surface. This was quickly done with the CC-80 Paving Breaker shown on the ground to the left of the operator. Next, a Size 158 Digger fitted with a spade loosened the dirt in the trench.

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One man using an air operated Digger can loosen more material than six to eight men using ordinary hand methods. The usual savings realized by these tools are even greater when frozen or extra hard ground must be picked or loosened.

There are six sizes of I-R Air Diggers. They range in weight from 19½ to 40½ lbs and have ample power to pick or loosen nearly any material short of hard rock. This wide application is made possible by a variety of chisels, spades and flat picks.

The I-R Backfill Tamper is a companion tool to the Digger and has an unequalled reputation in its field of service. The Tamper makes short, positive work of backfilling excavations, tamping concrete work of all kinds, and tamping around gas or water mains.

After the necessary conduit repairs had been made the trench was filled. To pack the dirt solidly and evenly and to avoid any subsequent settlement, a Model 34 Backfill Tamper was used.

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Digging, hauling and automatic dumping are merged into a continuous operation controlled by one operator. Power requirement is moderate. Maintenance is simple.

Sauerman Slackline Cableway dumping spoil onto pile.

Sauerman Tower Excavator shown above offers large capacity in loading materials from pit or storage pile into cars or other conveyance.

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of the American Bridge Co. Henry T. Heald, president of the Illinois Institute of Technology, becomes first vice president; A. K. Bushman, district engineer of the American Bridge Co. Henry T. Heald, president of the Illinois Institute of Technology, becomes first vice president; A. K. Bushman, district engineer of the industrial division of General Electric Co., Chicago, second vice president; and T. LeClair, staff engineer, Commonwealth Edison Co., Chicago, was re-elected treasurer. New members of the board of direction are Gustav Egloff, director of research, Universal Oil Products Co., and W. V. Kahler, general manager, state area, of the Illinois Bell Telephone Co.

The Canadian Institute of Steel Construction has moved its head office from Ottawa to Toronto, Ont. C. Henderson of the Canadian Bridge Co., Walkerville, Ont., is president and C. Manning, secretary and chief engineer.

J. J. Strickland and R. E. Kepler are directors of the newly-organized Durham, N. C., Engineers Club. Committees: Program, E. C. Dameron, J. T. Cranshaw, Otto Meier, Jr., and George Hackney. Finance. J. J. Strickland, chairman, D. M. Williams and Harold C. Bird, and publicity, E. S. Theis, chairman, M. A. Hamm and Joseph Waite, Jr.

M. W. Cameron of Indianapolis has been elected president of the Indiana Society of Professional Engineers. Other officers are Clyde E. Williams, first vice president, South Bend; Thomas T. Hardman, second vice president, Terre Haute; Raymond C. Casady, secretary, and Charles R. Rudiner, treasurer, both of Indianapolis. Directors are C. E. Vogelgesang, national director, and James E. Ioer, both of Indianapolis, and C. S. McKee, Evansville.

These officers of the Central Texas chapter of the Society of Professional Engineers have been elected: President, R. M. Sherman, vice president, M. E. Trestle, and Coy W. Borden, secretary-treasurer. L. H. Wood; directors, E. L. Kilingsworth, L. Griffith, J. R. LeBlanc, Alan Love and John A. Hart.

Roy Woodward, Pacific County engineer at South Bend, Wash., has been elected president of the Washington State Association of County Engineers. Harold Blanton of Franklin County was named vice president, and Hjalmar Walberg of Skagit County secretary-treasurer.

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Shovels, bulldozers, cranes, and scrapers are doing the same basic things now they did before the war. Yet our enemies, for all their years of preparation, failed almost completely to recognize the potential military value of dirt moving equipment. In the hands of American men, long accustomed to brilliant use of machines, excavating equipment is truly a double-edged sword, efficient in war and peace. V-63

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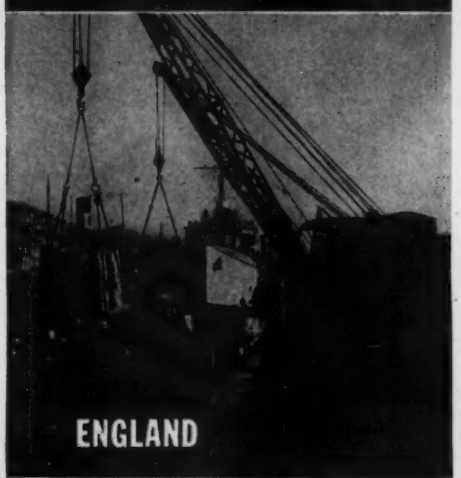
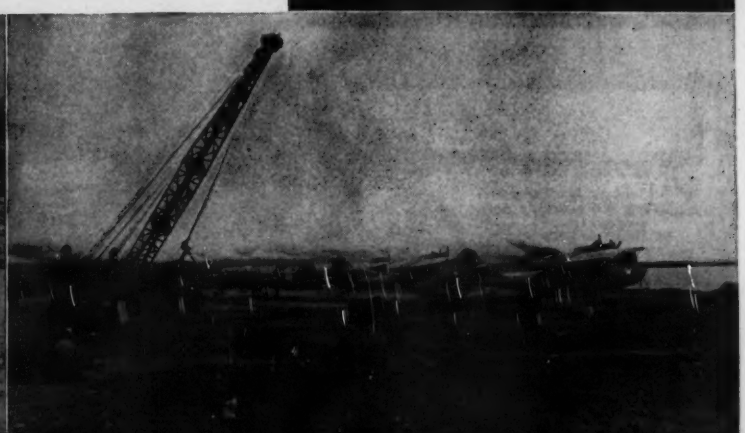


ENGLAND

ALASKA



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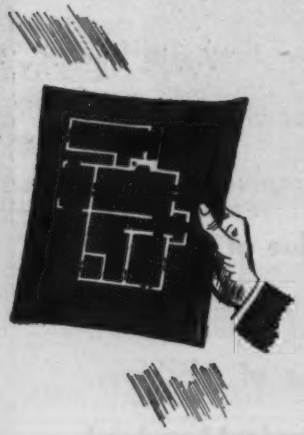

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BRIEF NEWS

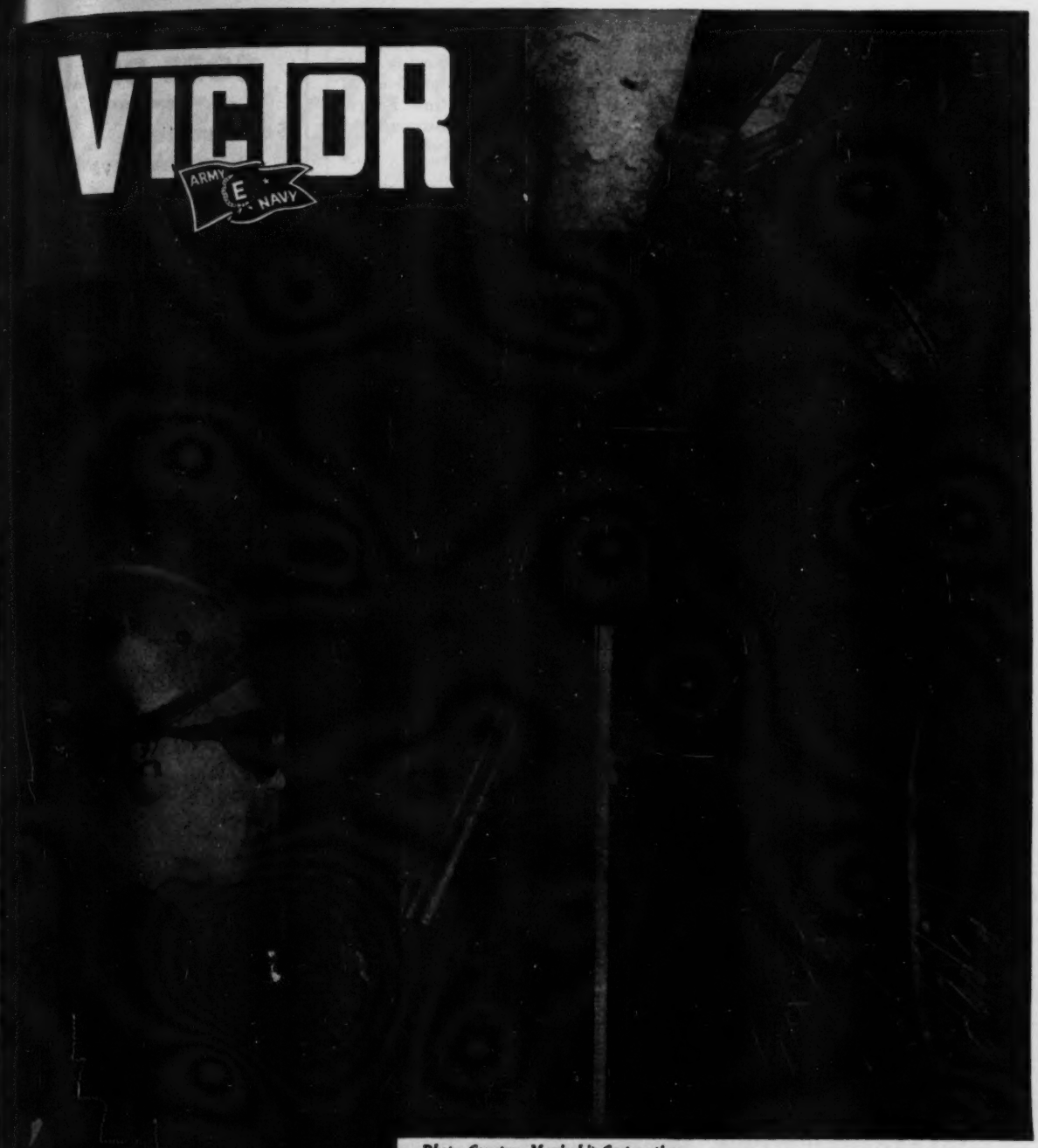
In order to fix building lines on city streets so that buildings will not encroach on rights of way essential to the development of the major street plan, the City Planning Commission of Houston, Tex., will make a year's study of streets.

The commission has also decided to draw up a metropolitan thoroughfare plan to create a system of major streets for the 5-mile belt around Houston subject to its jurisdiction.

The Mexico treasury department has decreed that portland cement may be imported into Mexico duty-free. The construction industry there has been affected by a shortage of cement. All cement imports must have the approval of the department of national economy and will be bought and sold at fixed prices. The decree provides fines of from $1,000 to $10,000 for violations.

Wartime Housing, a subsidiary of the Canadian government, has offered to supply 50 houses in St. John, N. B., for able bodied returned servicemen and their families; dependents of servicemen now overseas; and disabled servicemen and their families. The rent would be about $25 per month. An agreement is proposed between the Wartime Housing and the city council for ten years, with the city furnishing the land at $1 a year per lot, the lots to be connected with water and sewerage. Instead of taxes, the city must be willing to accept a stipulated annual sum, to be agreed on in advance. If the houses are sold the Wartime Housing would pay the city for the land and the land and buildings would become subject to usual taxation. The houses would cost about $3,000 to build, each with a concrete footing below the frost line. The city would guarantee rent collections from dependents of overseas servicemen. The pensions department of the Canadian government would be responsible for rent collections from disabled servicemen.

A precedent may be established when the Arkansas Utilities Commission receives an expected application for authority to build a reservoir for the benefit of rice growers in the Carlisle area. Chairman Marvin Hathcoat disclosed he had received from P. Keebey of Little Rock a request for permission to build a 2,000-foot dam at the head of Cooper's lake, about 5 miles south of Carlisle, to provide water for rice growers. The commission ex-



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grant a permit only after a formal application and hearing.

The proposed dam, Mr. Keebey said, would supply water to about 15 or 20 rice growers in Lonoke and Prairie counties. It would be constructed of earth with a concrete spillway.

Agustin Buenrostro, civil engineer, has assumed his duties as chief of the public works department of the Ministry of Communications and Public Works in Mexico. He succeeds Aaron Merino Hernandez who recently resigned. Buenrostro was for some time chief of the ministry's railroad construction and exploitation department.

A. P. Patrick, formerly dominion topographer, recently celebrated his 95th birthday at Calgary, Alta. Eduvcated in Upper Canada College, he was a member of the Canadian Pacific Railroad survey party which made the railway's first exploratory survey, north of the Great Lakes.

As the site for 500 units of demountable war dwellings, the San Francisco Housing Authority has decided to reclaim 33 acres of South Basin tidelands near Hunter's Point. The reclaimed land will be sold at the war's end, according to E. N. Ayer, chairman of the authority. The location is choice for industrial development in line with San Francisco's master plan.

Federal housing authorities have approved the plan to reclaim the land which will cost approximately $250,000. The demountable housing will be built in areas of non-critical labor and shipped there. The houses will cost $1,600 to $1,800 each and will house Hunters Point Navy Yard workers.

The Mexican secretary of national economy has issued a decree authorizing importation of corrugated iron reinforcement rods in unlimited quantities above a previously established quota because domestic production is unable to meet builders' demands. The decree said that lack of iron reinforcement rods, used mainly to reinforce concrete, has halted work on many government and private projects, throwing many men temporarily out of work.

The decree specifies that 30 percent of imported reinforcement rods shall be sold to the government for federal projects and that the remainder shall be sold at prices fixed by the treasury department.

Assuring postwar construction of the Bayshore Freeway, which will permit unimpeded flow of traffic between San Francisco and peninsula points, the city of San Francisco has begun purchase

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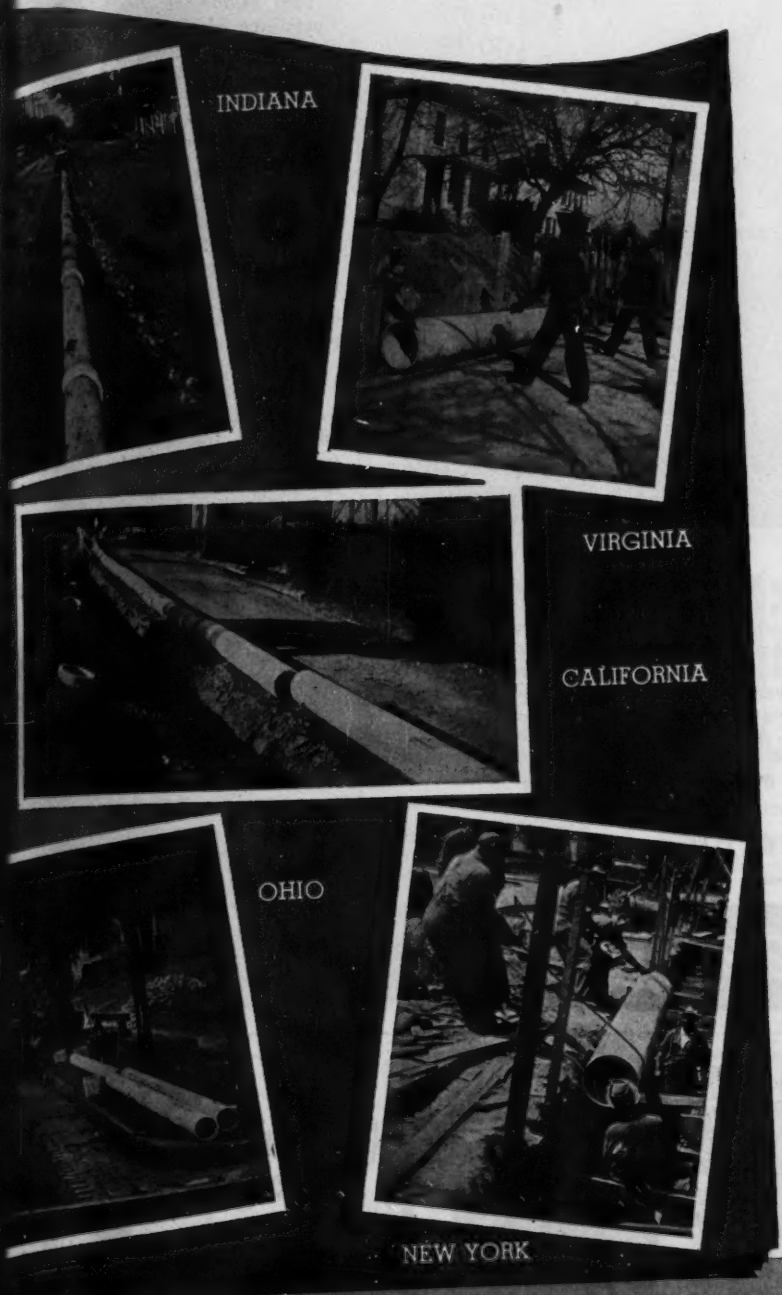

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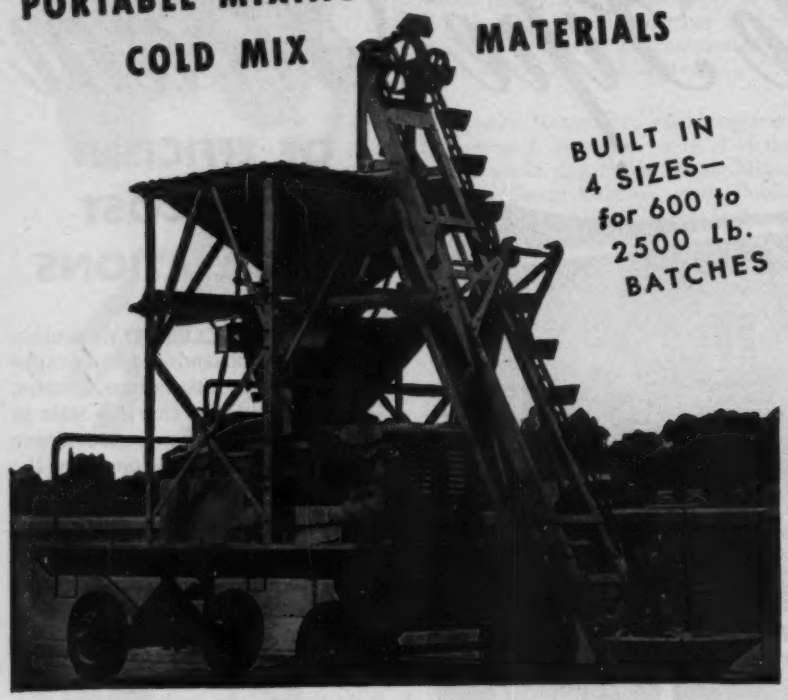

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of $515,000 worth of property under an agreement with the California State Highway Commission.

Money to acquire the property was allocated from the gas tax funds the city received from the state for highway improvements. Land being purchased parallels to a great extent the Highway Commission.

The Municipal Postwar Planning Committee of Waco, Tex., has recommended to the City Commission a plan to finance a $1,000,000 bond issue for postwar construction projects. It recommends a 25 per cent increase in water rates and a service charge for collecting garbage to pay for the bond issue.

The plan also recommended that all other debts of Waco be paid off in a period of 12 years by raising the tax rate from $2.43 per $100 valuation to the legal limit of $2.50. This would be reduced to $1.96 at the end of a 12-year period.

William J. Cox, Connecticut highway commissioner, has submitted to officials of Darien, Greenwich, Stamford, Westport and Norwalk maps of the proposed express highway across Fairfield County. The section from the New York State line to a point east of the Saugatuck River in Westport is most urgently needed. Right-of-way surveys or construction will not be undertaken until the public and the legislature have taken action. Commissioner Cox declared early planning is required for proper development of the whole highway system.

At the present rate of receipts, Bankhead Tunnel at Mobile, Ala., will pay for itself in 15 years, Mayor Robin Herndon predicted recently. The tunnel revenues are continuing to increase, Herndon declared, pointing out that the traffic tube is one of a very few of its type in the country showing an increase. Gross receipts, the mayor said, for the nine-month period beginning October 1,

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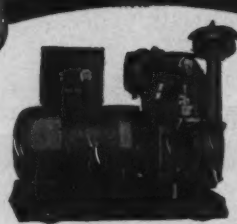

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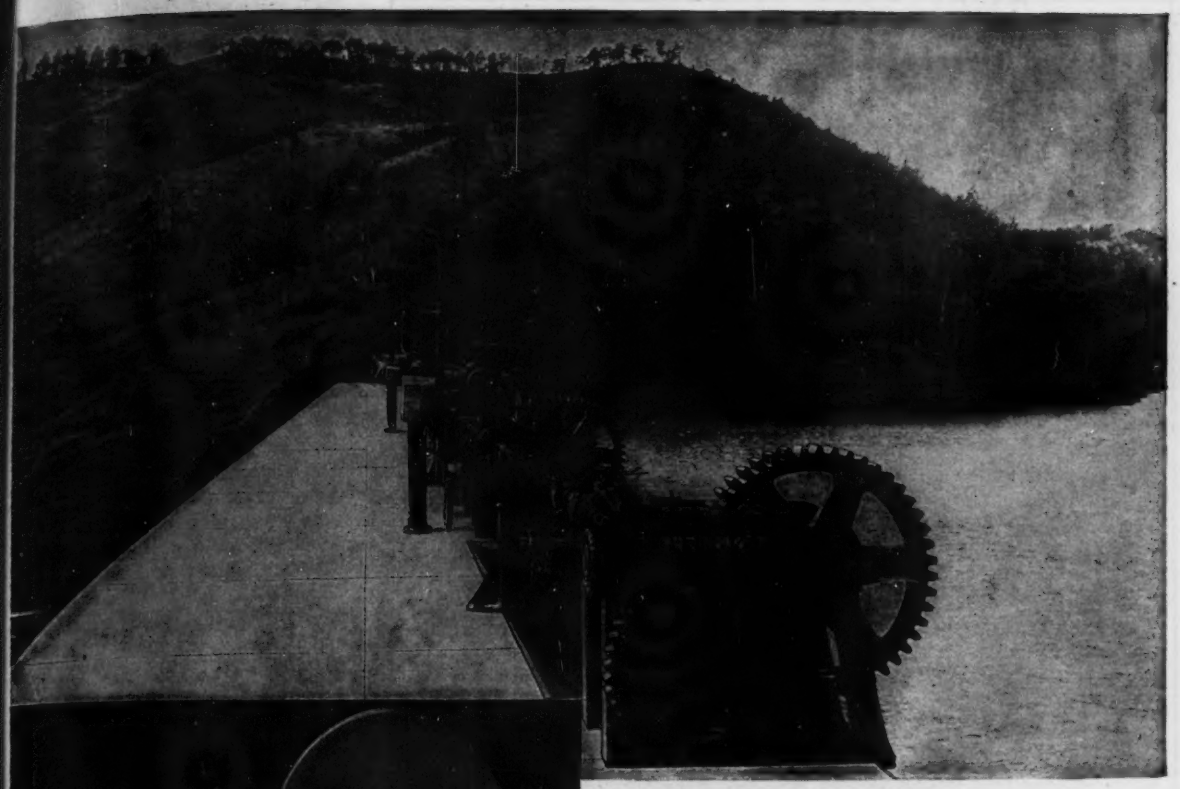

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THE PROBLEMS involved in hoisting mechanisms and gates are many and varied. The solution of them is almost a science in itself. Hence, as both are vital equipment of every water power plant, great care must be given to their selection.

Our experience of more than 69 years, covering all branches of hydraulic science and machinery building is at your disposal for discussion of your hoist and gate problems. It can be invaluable to you—not only as a guide in making your analysis, but in assuring you of maximum returns on your investment! Perhaps, one of our standard hoists will meet your needs, as our line is very complete. If not, furnished with full data on your problem and its characteristics, we can design and build the equipment exactly suited to your requirements. Write us.

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ARE WELDED CONSTRUCTION

TO keep pace with war's stepped-up tempo, International Steel Company technicians and shopmen are daily matching wits with new production problems and schedules. They are pitting their sharpened skills against the need for faster-built, better built ships, for invasion docks, trestles and bridges.

Only when peace comes will the whole story of this tremendous effort be told. It will be told in faster, lower-cost production and in new prefabrication methods. Yes, it will take less time after the war to deliver to you structural steel, bridges, steel trusses, packaged windows, joists, and other International Steel products—and they'll be better and lower priced because of our war production experience.

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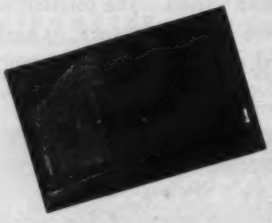

New low cost . . . Rapid field assembly with unskilled labor . . . Simple expansion, alteration or removal with 100% salvage of parts.

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1943, and ended June 30, of this year, were $343,053.30. Using that figure as a guide the average for the year will be about $457,404.40.

Expenditure of $75,000 to continue engineering studies of the undeveloped power resources of Owens Gorge, in Inyo County, Calif., has been authorized by the Board of Water and Power Commissioners of Los Angeles. The work will extend studies of most efficient locations for power plants, penstock and surge chambers. Complete development of gorge power has been under discussion for some years.

Construction of 600 new housing units in Milwaukee for in-migrant war workers and for 100 conversion units has been approved at Washington. The new construction units are to have two or more bedrooms and will be built by private contractors. Fifty of the new units were allotted to the city of Waukesha, and 50 of those for Milwaukee are to be reserved for negro occupancy.

The Jefferson County Commission, Birmingham, Ala., has authorized an increase of $1,180 per month in salaries for the staff of County Engineer Claude Rogers. New workers will include a bridge engineer at a salary of $275 per month, two transit men, three chainmen, a tracer clerk and laboratory men for tests of material used in road construction. The increased force will carry on the detail work of the road department, set up a program for the construction of farm-to-market roads in Jefferson County, and work out engineering details for commencement of this new work as soon as funds are available.

In an effort to eliminate recurrent minor slides that have occurred during the past three years at Mapleton on the William Penn Highway, Pennsylvania State Highway Department forces are adopting new measures, including the removal of approximately 31,000 cu. yd. of earth. Department employees, a large fleet of trucks, a bulldozer and two power shovels are being used. Two-way traffic on the three-lane highway is being maintained. It is estimated that the project will be completed in two months.

Contractors bidding on the construction of sewerage, drainage and water facilities for housing projects to serve Higgins Aircraft Corp. at New Orleans, La., will face cancellation if federal financing is withdrawn, according to a decision of the New Orleans Sewerage & Water Board. The board voted to insert in contracts a clause under which it can cancel and order work stopped

READY AND WAITING

his Mack Model FC six-wheeler, with a capacity of 30 tons, is the largest standard truck built. It is especially adapted for use in quarries and strip mines, and for hauling of nickel, copper, iron and other ores.

THE post-war world won't be handed to us ready-made . . . but there will be a ready and waiting market for quarry and mining products. Housing, highways, perhaps new peacetime factories, dams and power-plants will keep supplier and builder busy for years.

Because of their proved ability to haul large tonnage at low cost, heavy duty motor trucks will have a vital part in this work, and far-sighted operators of modern mines are already giving close study to the selection of truck equipment best suited to their particular needs.

Plan *your* future operations now . . . with the advice of our engineers, men who know the job you face, and the kind of truck best fitted to do it. Address your inquiry to Public Works and Mines Division, Mack Trucks, Inc., 350 Fifth Ave., New York 1, New York.

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The deep-digging, hungry mouths of Brownhoist Clamshell buckets speed up the handling of coal, ore, gravel, dirt, cinders, clay, etc. Large sheaves reduce rope wear and maintenance. Sturdy construction and latest design insures long life. Available in rope-reeve, power-wheel and link type. Industrial Brownhoist Corporation, Bay City, Michigan. Offices in New York City, Philadelphia, Pittsburgh, Cleveland and Chicago.

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An important working tool to help you solve technical problems faster, this book makes available for rapid use the fundamental concepts, methods, and practical applications of simple calculus. The entire subject of differential and integral calculus is offered in easily understood, readily remembered question-and-answer form.

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This book presents calculus practically and thoroughly by means of direct questions and answers. 736 questions are given together with their complete answers. Many worked-out illustrative examples are included as well as test problems and answers. Section I on Simple Differential Calculus covers constants, variable, functions, limits, logarithms, etc. Section II on Simple Integral Calculus explains the fundamental ideas of integration; discusses mean value, length of an arc, center of gravity, etc., and gives an introduction to differential equations. A final section deals with the applications of calculus to various technical fields. Fully worked out are such useful problems as these:

—What are the equations of motion of a projectile fired at a speed of 1,800 feet per second at an inclination of 27 degrees?

—How do you obtain a common log from a natural log?

—At what peripheral speed is the power output of an impulse turbine a maximum if it is driven by a jet of water or steam flowing at 30 feet per second?

—How do you arrive at the relation between the pressure developed by a centrifugal fan and the fan speed?

By A. ALBERT KLAF
Civil Engineer, Board of Water Supply, City of New York

431 pages, 5½ x 8½, 180 illustrations, $3.00

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if at any time federal financial support is withdrawn from the project.

Montana's primary highway funds will be decreased, but secondary road construction allocations are increased in comparison to pre-war figures by House Resolution 4915 approved recently, according to Howard W. Holmes, Montana state highway engineer. The state will be allocated $8,039,000 annually for post-war construction of highways.

As now approved by the House committee, Montana would receive $3,642,000 for primary highways, $2,023,000 for secondary and $2,428,000 for urban highways. These funds, according to Holmes, would be matched under the act on a basis of 40 percent state funds to 60 percent federal, instead of the previous ratio of 25 percent to 75 percent. Western states are seeking to have the previous ratio reinstated in the bill.

Holmes said that the bill, if passed, would reduce primary funds about 50 percent while providing almost six times the pre-war secondary highway monies available.

Western states are protesting the division of funds on a basis of one-half population and one-quarter each for area and post-road mileage, instead of one-third for each factor, terming it "discrimination" against the less densely populated West.

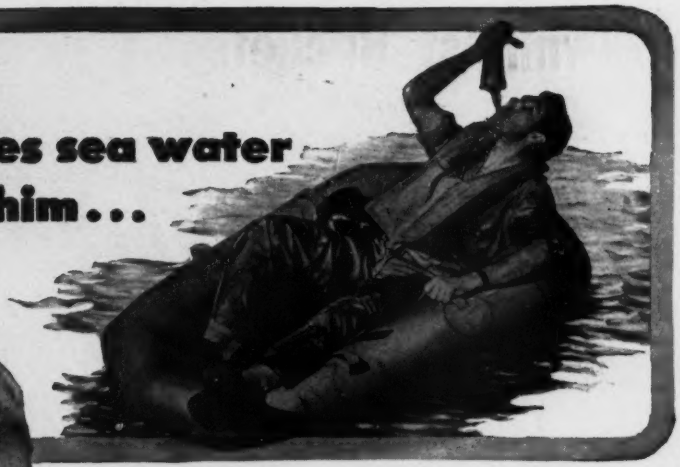
Representatives of eight major air lines met recently in the offices of the United Airlines in Chicago to form an engineering committee to agree on the tentative plan and architecture of a proposed new terminal building at the municipal airport.

The plan calls for construction of the new facilities as soon as priorities can be obtained. Technicians for the air lines have recommended that the building be constructed at the northeast corner of the airport and that it have facilities for a peak of 72 planes movements an hour. The present terminal has a capacity of 40 planes an hour.

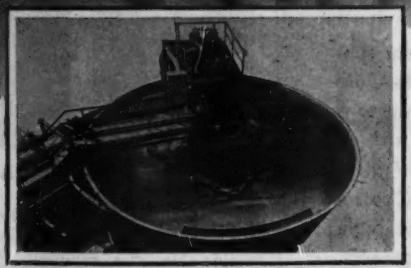
The proposed building will cost between $900,000 and $1,200,000. Mayor Kelly has now given the plan his backing and has expressed confidence that priorities can be obtained.

The labor problem delaying start of the north unit of the Deschutes irrigation project in central Oregon has been solved and work can start immediately, says L. C. Stoll, state War Manpower director. The project, to cost $8,000,000, with $1,000,000 now available, will reclaim 20,000 acres for 1945 crops. Stoll said labor would not be drawn from lumbering and agriculture, but will be will be through the U. S. employment service.

The skill that makes sea water drinkable for him...



..can give your entire city a soft, sparkling water supply



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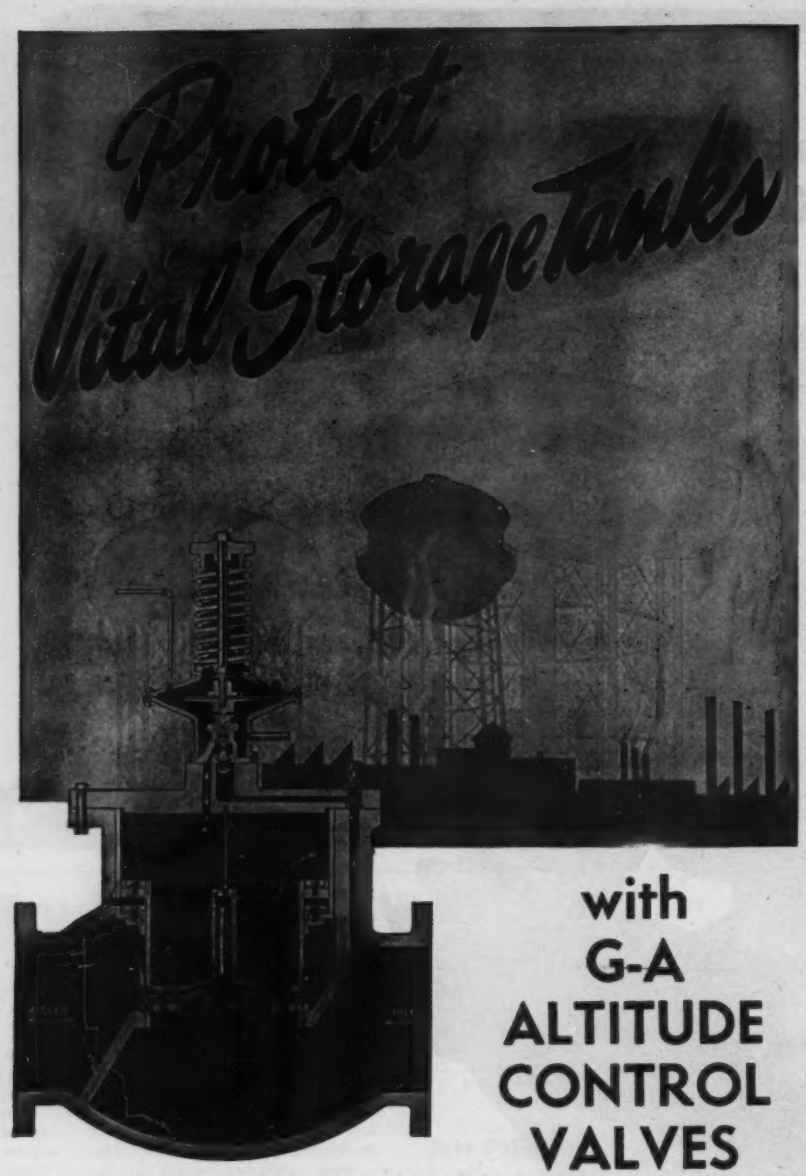

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MANUFACTURERS' ACTIVITIES

WILLIAM BLACKIE and William McBrian have been made vice-presidents of Caterpillar Tractor Co. William H. Franklin has been made controller, succeeding Mr. Blackie.

Announcement has also been made of the appointment of Edward W. Jackson as general parts manager, succeeding L. G. Morgan who has become head of parts department activities on the Pacific coast.

W. Blackie

W. J. McBrian

Mr. McBrian, who has been treasurer of the company from November, 193 to the time of his present advancement joined the "Caterpillar" organization in 1928 as credit manager.

Mr. Blackie went to the Caterpillar organization in May, 1939, as controller. Prior to that time he had for nine years spent several weeks of each year in Peoria making an annual independent audit of the accounts of "Caterpillar" and other Peoria concerns.

E. W. Jackson

W. H. Franklin

Mr. Franklin's advancement follows three years' service as assistant controller. He is a graduate of Princeton University and a certified public accountant and was engaged in public accounting work up to the time of joining Caterpillar in 1941.

Mr. Jackson is a native of Baltimore, Md., and a graduate in engineering of Johns Hopkins University. For four years after his graduation from college he was a civilian engineer in the U. S. Ordnance Department as proof director at the Aberdeen Proving Grounds. In March, 1933, he became a service engi-

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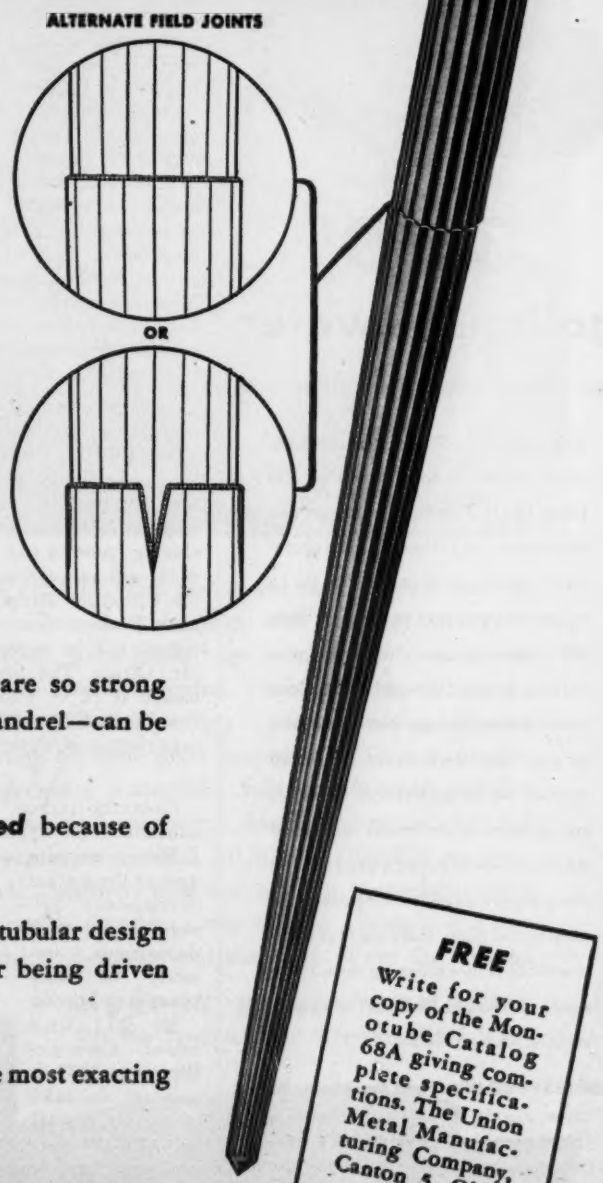

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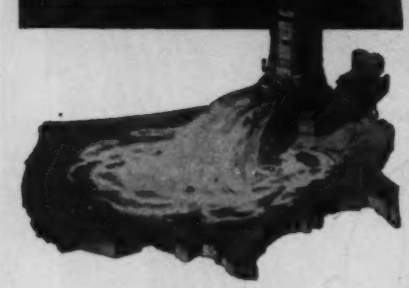

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TURBINE HI-LIFT PUMPS HYDRO-FOIL HYDRO-JET

neer for the company, and in 1937 was promoted to general service manager. In 1942, he became assistant to the president. As general parts manager, he is responsible for supplying replacement parts for all Caterpillar products sold in past years, and also of meeting the present greatly expanded military requirements.

THE APPOINTMENT of George Guler as sales manager of the airconditioning controls division of Minneapolis-Honeywell Regulator Co. has been announced. Guler, who has been associated with the company for fifteen years, will make his headquarters in Minneapolis and will be succeeded as zone supervisor of air-conditioning controls sales in New York by Lou Belford, field supervisor of the Aero division for the past two years. Belford has just returned from eight months service in the British Isles.

ERNEST L. OLRICH, president of Munsing Wear, Inc., Minneapolis, Minn., was recently appointed special assistant to the Secretary of the Treasury, to work on problems connected with the disposal of surplus consumer goods, including construction equipment. This work will proceed in cooperation with the Utilization Branch of the Procurement Division. Various industrial specialists will be appointed to work with Mr. Olrich. The first of these to be named is H. O. Penn Machinery Co., New York City, who will manage the construction equipment section.

CARNEGIE-ILLINOIS STEEL CORP. has announced the appointment of Robert J. Ritchey as manager of the market development division of the sales department, formerly the sales promotion bureau. Mr. Ritchey joined Carnegie-Illinois in 1937 as assistant in sales promotion. In 1941 he was made assistant manager of sales promotion, and since December, 1941, has been acting as manager of the present market development division, which has men directing promotional activities in each of the industries through which steel finds its way to the ultimate consumer. These men are industry consultants, their activities designed to pro-

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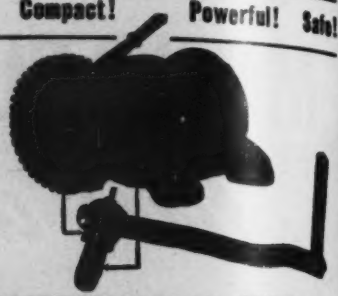

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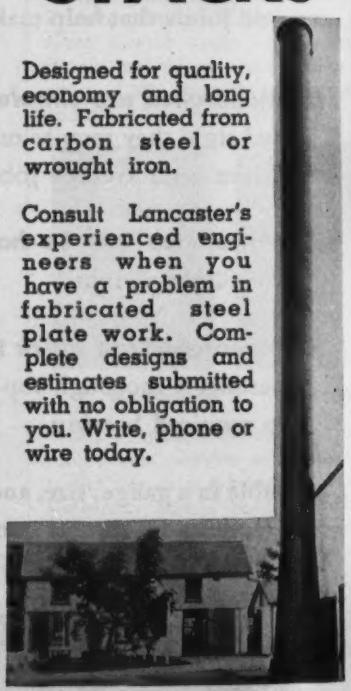

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WHATEVER the power requirements may be, you can meet them with Standard MURPHY DIESEL units hooked up in multiples to equal the total horsepower needed. Peak loads may call for the full combined capacity . . . partial loads may permit cutting off some units temporarily. Thus a practical power plant is assured . . . fully capable when called to put out big horsepower . . . ideally economical when full power is not needed. MURPHY DIESELS are compact . . . relatively light in weight for heavy-duty service . . . readily portable . . . easy to start . . . simple and economical to operate and maintain. Write for bulletin.

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vide stimulation for the successful promotion of steel and steel products.

AT A RECENT MEETING of the Philadelphia section, American Society of Civil Engineers, Francis S. Friel was elected president. He directs the engineering staff of Albright & Friel Inc., consulting engineers, specializing in water supply and purification, sewerage and sewage treatment, industrial waste disposal, incineration and general municipal engineering.

IN A RECENT ANNOUNCEMENT by the Caterpillar Tractor Co., Peoria, Ill., the Cliff Miller Machinery Co. was named distributor for Omaha, Neb., and surrounding territory. Heading the new company as general manager is Cliff Miller, who has been associated with the distribution of Caterpillar and allied equipment in that territory for over 20 years. His assistant is M. Lee Coonan, a district representative for the LaPlant-Choate Mfg. Co. of Cedar Rapids, Iowa, for several years. Clare Fintzell, picture above, is sales manager for the company.

CASELLINI-VENABLE CORP. of Barre, Vt., have become distributors for Caterpillar diesel engines, tractors, and motor graders, for all New Hampshire except two counties and for all Vermont except one county. Cassellini-Venable has served the heavy machinery trade there for the past twelve years.

THE R. D. COLE MFG. CO. of Newnan, Ga., recently celebrated its 90th anniversary. It has served through three major wars and is now engaged in production of prefabricated component ship parts for the U. S. Maritime Commission, and has received the Merit Award. Through the 90 years the concern has been under the same family management, and members of the third and fourth generation are now among its operating staff.

LOU F. KINDERMAN, for many years purchasing agent in steel industries, in construction of steel mills and as sales representative, has been appointed sales manager of the Rail & Industrial Equipment Co. He will be in the New York City offices.

RICHARD B. GORDON, 52, vice president and director of The Penetryn System, Inc., Cleveland, Ohio, died recently. After graduation from the University of Vermont in 1916 as a civil

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8" transparent triangle, adjustable from 0 to 90° angle. Secure clamping device. No. 1588 ... $4.00

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For less effort and greater speed. In wide range of heights—vertical capitals, vertical numerals or both. Prices range from $2.00 for ¼" numerals to $3.10 for ½" capitals.
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Cleveland	CHE. 7347	Omaha	ATLANTIC 7890
Columbus	MAIN 3420	Philadelphia	LOM. 7044
Dallas	RIVERSIDE 4403	Pittsburgh	ATL. 3350
Dayton	ADAMS 9174	Portland	ATWATER 8681
Denver	MAIN 5161	St. Louis	CHESTNUT 0688
Detroit	RAN. 8483	Salt Lake City	4-7823
Ft. Wayne	ANTY 4142	San Diego	FRANKLIN 1344
Fort Worth	3-3244	San Francisco	DOU. 5975
Hollywd	GRANITE 4188	Seattle	MAIN 4022
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Indianapolis	MKT. 4466	Toledo	ADAMS 7224
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on ROGERS TRAILERS

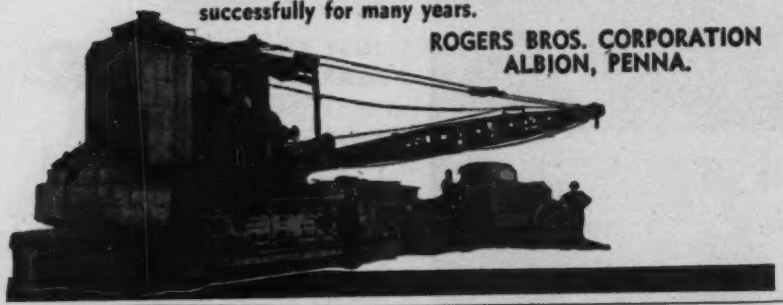
EXPERIENCE *builds 'em*
PERFORMANCE *sells 'em*

MARITIME History is being written in the United States today! America's shipbuilding industry will launch more ships in 1944 than all the rest of the world combined.

ROGERS TRAILERS are a vital link in this new high-speed method of ship construction for they are transporting the machinery . . . boilers, bulkheads, engines . . . moving heavy boat sections . . . speeding Victory ships down to the sea!

Thousands of ROGERS TRAILERS are serving efficiently on the home front too and the new models which will again be available to all when present war contracts are completed, will be better engineered and more efficient than the multitude which have been operated so successfully for many years.

ROGERS BROS. CORPORATION
ALBION, PENNA.



engineer, he was employed by th Pennsylvania and New York Centr railroads, and from 1931 to his death h Penetryn in charge of railroad and i dustrial sales.

HENRY H. RITCHETTE has been ap pointed manager of the contractors tool division of the Independent Pneu matic Tool Co., with headquarters a the home office in Chicago, Ill.

THE MISSOURI PORTLAND CEMENT Co. of St. Louis, Mo., has recentl bought a plant site of 30 acres o North Thomas Street and has com pleted plans for the construction of portland cement plant to be built a soon as WPB regulations permit. Th plant will have an annual capacity o 750,000 bbl.

THE ELECTION of Earl A. Tanner t the presidency of the Inland Steel Container Co. is announced by the Inland Steel Co., Chicago. The company is a subsidiary of Inland Steel. Mr. Tanner, who has been president since 1938 of the Milcor Steel Co., Milwaukee, will head both companies. The Inland Steel Container Co., formerly the Wilson and Bennett Manufacturing Co., is a large manufacturer of steel barrels, drums and pails, with plants in Chicago, Jersey City and New Orleans, and sales offices in all principal cities.

IN PARTIAL OPERATION for several months, the huge tubular mill at Gary Ind., was formally opened recently when 250 industrial executives and ranking Army and Navy officials made an inspection of the plant, operated for the duration by the Tubular Alloy Steel Corp., a U. S. Steel Corp. subsidiary. The new plant is in the N

WILLIAMS *Buckets*

WELDED ROLLED STEEL CONSTRUCTION

All types and capacities for all conditions. Send for Catalog.

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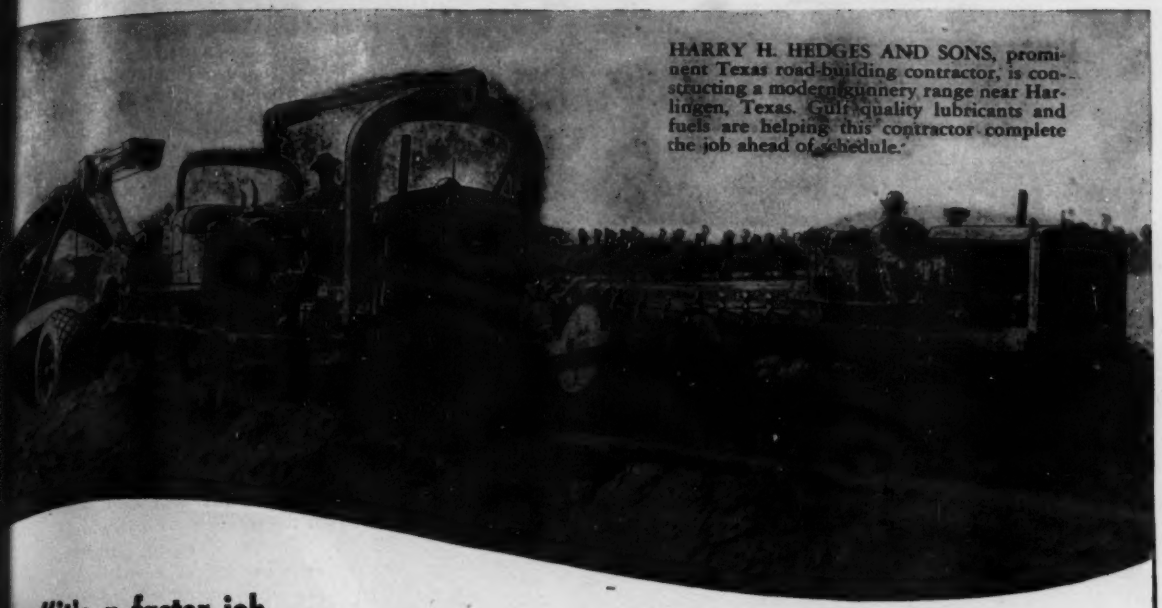
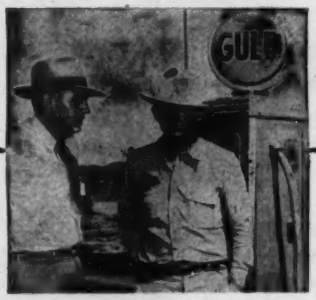


HARRY H. HEDGES AND SONS, prominent Texas road-building contractor, is constructing a modern gunnery range near Harlingen, Texas. Gulf quality lubricants and fuels are helping this contractor complete the job ahead of schedule.

"it's a faster job with Gulf Quality Lubricants and Fuels"—

says Superintendent Y. A. Rankin



Gulf products help us get top performance from equipment with freedom from operating troubles."

During my 20 years of construction experience, we learned the importance of using quality lubricants and fuels to get the most out of equipment and keep it working continuously," says Y. A. Rankin, Superintendent on this gunnery range project. "With Gulf Products we're getting the kind of lubrication and fuel performance that sells a speedier job, with low maintenance costs."

The use of quality petroleum products is one of the surest guarantees of efficient job operation and is best insurance against breakdowns and mechanical troubles. That is why so many contractors engaged in vital war construction work specify Gulf quality lubricants and motor fuels.

In addition to their high quality, there are other advantages in using Gulf Products: first, an experienced Gulf Service Engineer recommends, on the job, the proper types and grades for each requirement; second, Gulf's wide distribution through more than 1200 warehouses located throughout 30 states from Maine to New Mexico, insures prompt delivery.

Write, wire, or phone your nearest Gulf office today, and arrange to use Gulf higher quality lubricants and fuels on your next job. They will help you complete it more quickly and at a larger profit.

GULF

GULF OIL CORPORATION • GULF REFINING COMPANY

GULF BUILDING, PITTSBURGH 30, PA.

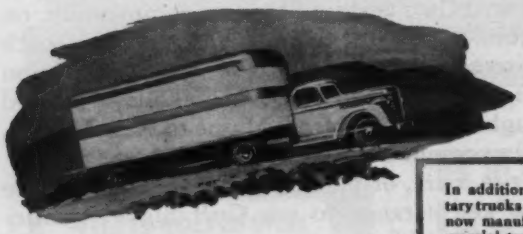
BACK THE ATTACK . . . BUY MORE WAR BONDS!

Do You Live in this Blackout Area?

Here's a blackout map all right, but it is one that has to do with wartime transportation rather than with air raid protection.

These vast, blacked-out areas contain thousands of farms and factories, mines and mills which are making large and vital contributions to America's war effort. Without exception, they depend *entirely* upon motor trucks to bring in supplies and raw materials, to carry away produce and products. No rail line operates within 25 miles of any of them.

If this is not sufficient evidence of the indispensability of Highway Transportation to our war effort and our everyday living, look at these astonishing figures . . . More than 54,000, or 43 per cent of all our country's communities are served by motor truck and coach transport alone.



In addition to producing thousands of military trucks and amphibian "Ducks," GMC is now manufacturing several thousand commercial trucks for use in essential civilian occupations. If you are eligible for a new truck, see your GMC dealer first for "The Truck of Value." Remember, too, that your GMC dealer is headquarters for the original truck-saving, time-saving Preventive Maintenance Service.

INVEST IN VICTORY . . . BUY MORE WAR BONDS

GMC TRUCK & COACH DIVISION
General Motors Corporation

Home of Commercial GMC Trucks and GM Coaches . . .
Volume Producer of GMC Army Trucks and Amphibian "Ducks"

tional Tube Co. plant, built over 2 years ago and remodeled recently by the Defense Plant Corp. at a cost of $28,000,000. This work included installation of new equipment for the large-scale production of seamless alloy tube for planes, guns, tanks and ships. Now nearing its peak in production, the new plant employs 3,700 workers, 48 percent of them women. Charles R. Cox is president.

GLENN A. BASSETT, president of Gar Wood Industries, Inc., Detroit, Mich., has announced a reorganization of the company's manufacturing set-up to ease the postwar transition and also to improve its output for the Army and Navy. This involves a vice-president in charge of manufacturing, a production control manager and a general superintendent of the mechanical division.

Clinton W. Wood, formerly vice-president and manager of Plant 4, has been named vice-president in charge of manufacturing. Alonze R. Ketcham, formerly production manager of winch war contracts, will be production control manager and will be responsible for personnel management, and for machine and departmental scheduling of production manufacturing. Henry Kvindlog has been made general superintendent of the mechanical division.

Gar Wood makes truck bodies, hoists, winches, cranes, road machinery, tanks for transporting fluids by trucks, and home heating equipment.

FREDERICK E. MOSCOVICS, for the past three years technical advisor to the Army Air Forces, has been appointed an industrial consultant for the A. O. Smith Corp., Milwaukee, Wis. Designer of one of the earliest motor cars, the Allen-Kingston, he was later vice president of the Nordyke Marmon Co., and for five years was president of the Stutz Motor Car Co. J. D. Zaiser, former assistant general manager, has been made executive vice president.

H. P. BIGLER has been elected executive vice president of Connors Steel Co., Birmingham, Ala. He was formerly managing director of the Rail Steel Bar Association, which he established, and is now its president. He is chairman of the WPB technical advisory committee on steel reinforcement, a member of the advisory board, Reinforced Concrete Research, American Iron & Steel Institute, and a member of the Engineering Council of Birmingham. He is secretary of the committee on steel, and chairman of the subcommittee on reinforced steel, American Society for testing materials.

L. D. Luey has been appointed comptroller of the company. He is a graduate of the Massachusetts Institute of

already finished

"Wot's the use?" growls Gloomy Gus. "All day I tramp up and down and I don't get a chance to complain. No high spots; no low spots; no nuthin'; just flat pavement." That's why they call him Gloomy. Gus' job is to find the bad spots —the spots that are not level; that have to be patched up. Gus is not the final judge, though. The guy that drives across the stretch ten years after you leave is the real critic. He knows even better than Gus how good a job you did. Most jobs look good when you first put them down. How do they look ten years later?

Left: B-G Asphalt Finisher laying top course even with top edge of gutter.

The Leveling principle on the Barber-Greene Finisher is one of the many features that assures a smooth riding road. The Tamping action assures a long life for that smoothness. Unevenness and abrupt changes in the sub-base and base become a smooth flowing of the pavement. The mat smoothly rises and falls to meet the general contour of the roadway.

44-10

e profile view at right, with sideplate removed at spreader screws, shows the Level-g Arm principle. This arm (1) is attached to the screed unit at the rear of Finisher, ch like a rake handle is attached to the raking teeth. The extreme end of the rake ndle, or Arm, is attached to the tractor unit (2). A rise or fall of several inches of e crawlers is therefore reflected only slightly on the screed plate. Try this action rself with a rake. To make changes in mat thickness, the rear of the screed plates e screwed up or down by the control (3) at the opposite end of the Arm. The screed en gradually rides up to increase or cuts down to decrease the mat thickness. Cata-g 619 clearly illustrates this operation.

BARBER GREENE

AURORA, ILL., U. S. A.

SMITH

TAPPING SLEEVES

THE A.P. SMITH MFG CO EAST ORANGE, N.J.

Symbol of Quality Since 1889

MAKING PRESSURE CONNECTIONS

Without Stopping the Service

SMITH Tapping Sleeves for making pressure connections to A.W.W.A. standard mains, classes A, B and C, and for pressures up to 150 lbs. per square inch, are made in four types, here illustrated. At top: 1. Clamped Sleeve Joint; 2. Bolted Sleeve Joint. Bottom row: 3. Bolted Sleeve Joint with flanged end joint valve connection; 4. Hackensack Sleeve Joint with flanged end joint valve connection.

OTHER SMITH PRODUCTS

Valves and Hydrants — Valve Inserting Machines — Tapping Sleeves — Tapping Valves — Hat Flanges and Water Meters

Write for Catalog

A. P. SMITH TAPPING SLEEVES

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426-13th Street, Oakland, 12, California.
824 First Avenue, South, Seattle, Washington.
1317 Oakley Street, Orlando, Florida.

THE A. P. SMITH MFG. CO., EAST ORANGE, N. J.

Technology, and was formerly connected with the George S. May Co.

GREAT LAKES STEEL CORP. has appointed James A. Rowan director of public relations and advertising. The company has plans for postwar distribution of Stran steel buildings and other products now being made principally for the Navy, and Great Lakes' special series of low alloy steels, now going almost entirely into armor plate. Mr. Rowan has been special assistant to the director of the War Production Board's Steel Division at Washington, and at various times has served in technical editorial capacities.

K. W. CARR, sales manager for the Delevan Engineering Co., Des Moines, Ia., has announced the establishment of a division to handle engineering applications for some of the manufacturers the company represents. D. R. Morgan, formerly with the Midwest Supply Co., Des Moines, and for the last two years assistant chief of the electrical division, OPA, Washington, D. C., will be in charge. He will be assisted by J. M. Dean, engineering manager. The division will handle transmission, distribution, sub-station and metering equipment in Iowa and Nebraska.

GORDON S. MCKENTY has been named general sales manager for R. G. LeTourneau, Inc., Peoria, Ill., to succeed Ed R. Galvin, resigned to accept the presidency and a directorship of the Tyson Bearing Corp. at Massillon, Ohio.

Mr. McKenty was graduated from the University of Nebraska in 1924 and subsequently served as an engineer in Mexico and China for International Telephone and Telegraph. He rebuilt the entire

NO OTHER GRATING LIKE IT!

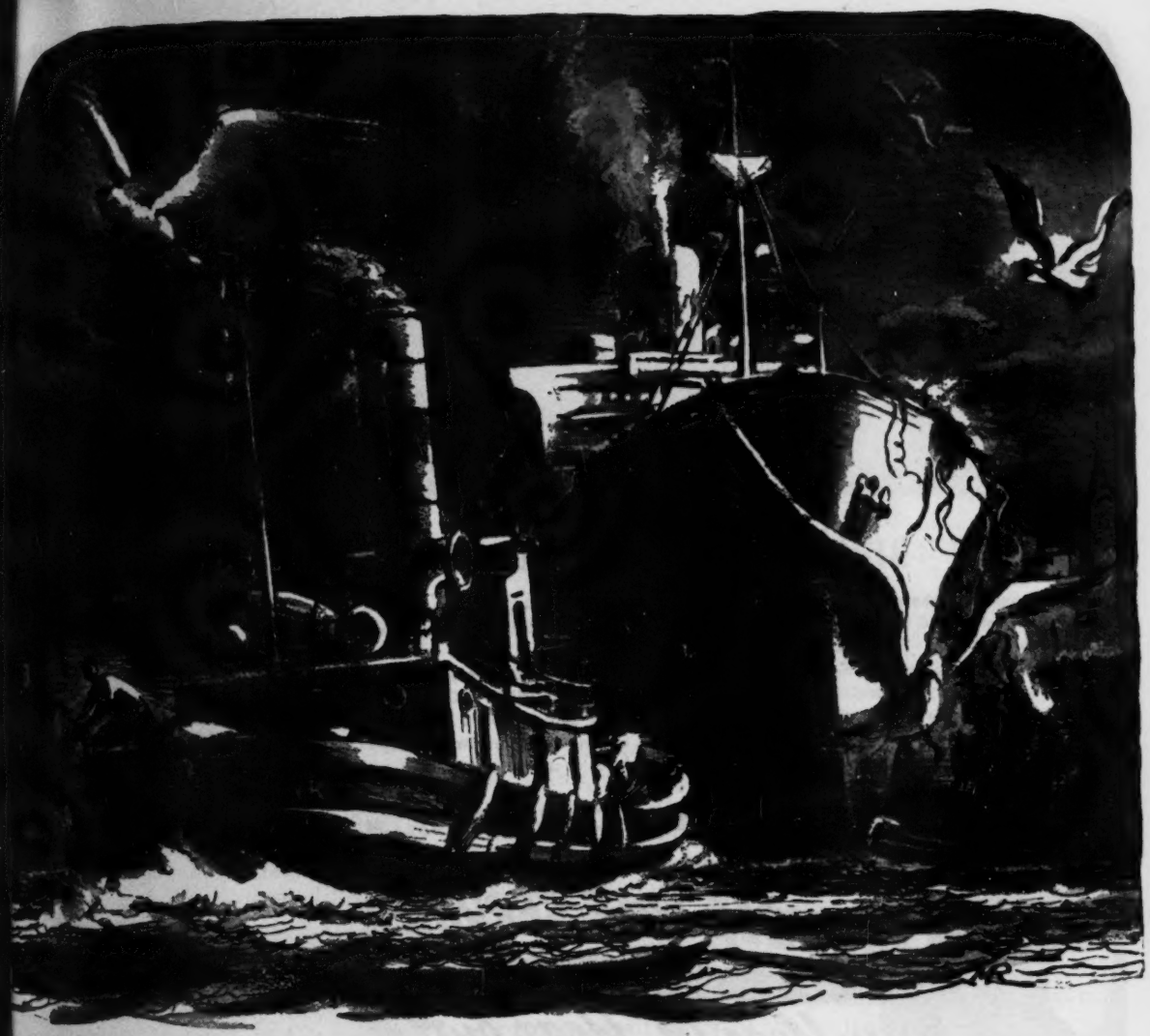
BLAW-KNOX ELECTROFORGED STEEL GRATING

Actually Blaw-Knox Grating is a one-piece, electroforged steel "material" which can be made to measure or cut to fit . . . Note these exclusive features:

1. Self-cleaning, no sharp corners to clog.
2. Maximum open area for light and air.
3. Easy to maintain . . . paint reaches entire surface.
4. Rigid electroforged construction means easy installation.
5. Twisted cross bar provides safe footing at all times.

Write for catalogue and sample.

BLAW-KNOX DIVISION of BLAW-KNOX COMPANY · 2001 FARMERS BANK BUILDING, PITTSBURGH, PA.



When big ships don't sail in secret any more

Your opportunities will grow with broadening peacetime horizons. But there will be intense competition for the business of building tomorrow's "new worlds." Prepare to concentrate on winning your share of these contracts: eliminate distracting problems.

One problem that need not worry you is insurance . . . if American Mutual is backing you up on your jobs. Long experience has well equipped American Mutual to meet your needs for insurance protection, accident prevention, and *operating economy*. It has been our job for many years to help contractors do their jobs with fewer headaches—*on time*, and profitably.

Get the benefit of these 5 American Mutual "extras":

1. *Construction-wise safety engineering experience*
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4. *Trained insurance experts, and*
5. *American Mutual's confidence-inspiring name on any contract.*

Our "Five Extras" booklet describes them. Send for your *free copy* today.

Be sure you also have American Mutual's other notable booklet, "Foremanship and Accident Prevention in Construction." It's *free*—request it today. American Mutual Liability Insurance Company, Dept. O-31, 142 Berkeley Street, Boston 16, Massachusetts.

**Dividends to policyholders have never been less than 20%*

Your helping hand in building tomorrow's "new worlds"

AMERICAN MUTUAL

the first American Liability insurance company

CEMENT GUN COMPANY

"GUNITE" CONTRACTORS

GENERAL OFFICES—ALLENTOWN, PENNA., U.S.A.

"GUNITE" DIVISION WALL IN RESERVOIR

The photograph shows a reinforced "GUNITE" division wall through the center of the Clear Springs Reservoir of the borough of Northampton, Penna., built to facilitate necessary periodical cleaning. Although the slab has a maximum thickness of 5", there is no leakage during cleaning periods. This wall was built by us in 1923 and in 1941, we lined the original concrete walls of this reservoir with "GUNITE."

Many reservoirs have been built and reconditioned with "GUNITE." Our Bulletin 2200 illustrates and describes outstanding examples as well as a multitude of other uses. Send for a copy.

MANUFACTURERS OF THE "CEMENT GUN"

Economy's Vertical Non-Clog Pump. Cap. 100 to 20,000 G.P.M. Heads to 200 ft.

TROUBLE FREE SERVICE ...Year in, Year out

That's what you can expect, and will receive if you specify Economy's "Sure-Flow" Vertical Non-Clog Pump. Especially designed to pass solids, rags, sewage and trash *without vibration* or whip from shock of temporary unbalance by heavy objects entering the impeller. Motor is mounted in a yoke directly above the pump and *flexibly coupled* to the pump. The pump has its own heavy duty bearings and separate shaft. Economy Non-Clog Pumps are ideal for:

- Sewage Disposal
- Underpass Drainage
- Food Industries
- Chemical Industries
- Paper Mills
- Sludge Removal
- Overflow Service
- Reduction Plants

If your problems fall in any of these applications—write today for Bulletin F534. It tells a story well worth reading.

ECONOMY PUMPS, Inc.

HAMILTON, OHIO, U. S. A.

Shanghai telephone exchange. He w in the Nebraska construction equipme sales field for five years prior to joini LeTourneau in 1935. Completion of t LeTourneau exclusive distributorshi policy, already 70 percent fulfilled, among Mr. McKenty's first assignmen

DR. PAUL F. CADMAN, economist the American Bankers Association, h become director of research and a sistant to the president for the Henry Kaiser Co., it was announced in Oa land, Calif. Dr. Cadman was former professor of corporation finance and i vestments at the University of Californi at Berkeley.

R. G. LETOURNEAU, INC., has a nounced the appointment of Thom Backus, formerly chief engineer for the Fuller Manufacturing Co., Kalamazoo, Mich., as its chief engineer. Mr. Backus has complete charge of LeTourneau designing, detailing, equipment testing and maintenance of quality. Prior to his Fuller affiliatio Mr. Backus was with General Motor Willys-Overland, Spicer Manufacturin and Clark Equipment companies. He a tended the University of Rochester Rochester, N. Y.

THE WICKWIRE SPENCER STEEL C announces the promotion of R. T. Dun lap to vice president in charge of pro duction. Also announced is the advanc of A. G. Bussmann to assistant to th president.

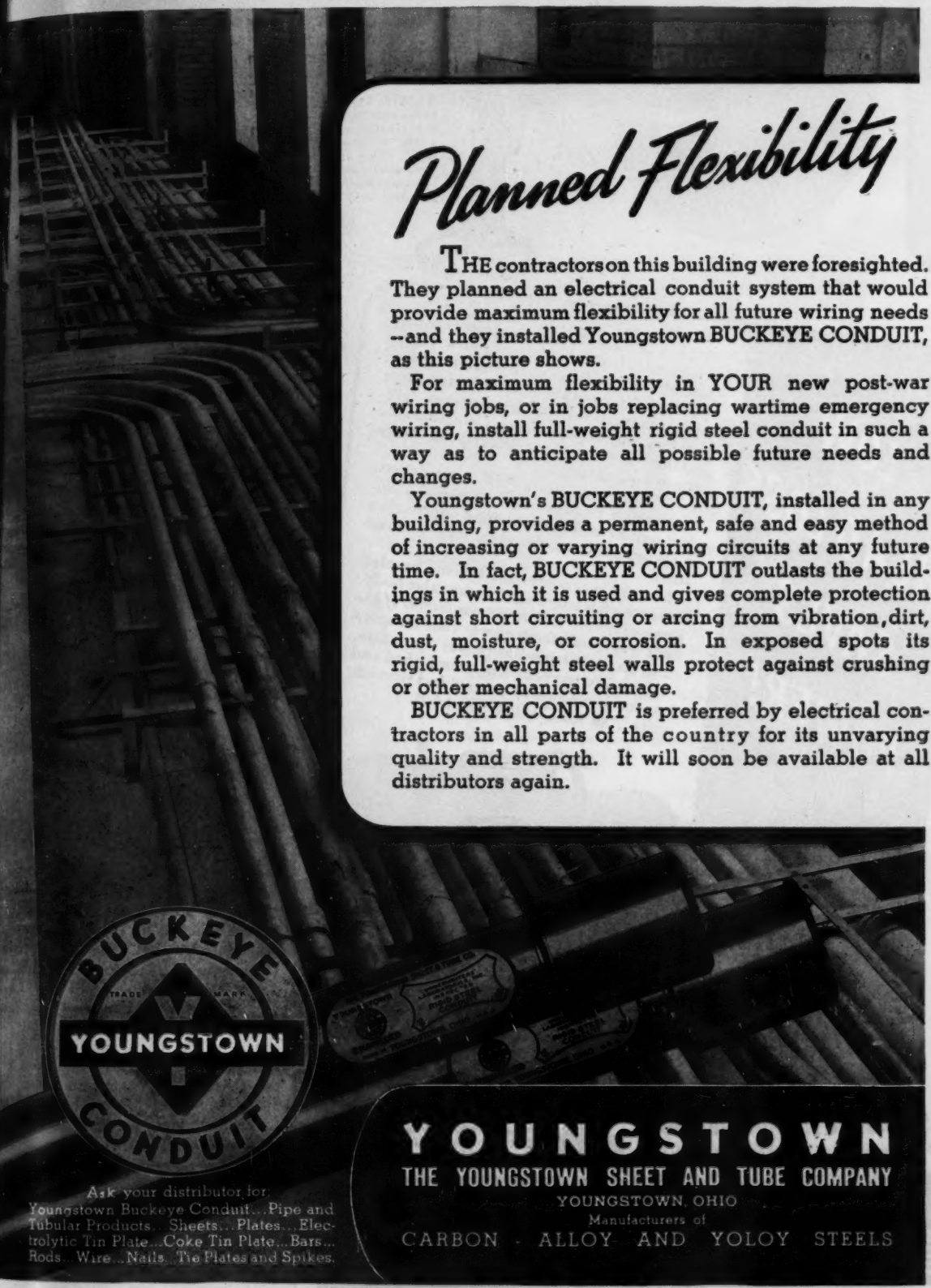
Mr. Dunlap was previously vice presi dent and general superintendent of th Buffalo district. Before joining Wick wire Spencer in 1943, he was genera works manager of the Vulcan Iro Works at Wilkes-Barre, Pa.

Mr. Bussmann previously has bee the assistant to the executive vice presi dent of Wickwire Spencer. He has bee associated with the company since 193 and was successively sales manager o the wire and springs divisions, sale manager of the Buffalo district, and ge eral sales manager.

THE GEORGE B. WHITEHEAD CO., Mechanic Street, Buffalo, N. Y., ha been appointed dealer for the Buckey Traction Ditcher Co., Findlay, Ohio. I will handle ditchers, shovels, spreader and finegraders in more than twenty upstate New York counties.

GEORGE H. ANDERSON, vice-presiden and chief of the raw materials divisio of the Lone Star Steel Co. at Dainger

FOR SAFETY'S SAKE . . . USE CONDUIT (*Full Weight Rigid Steel*)



Planned Flexibility

THE contractors on this building were foresighted. They planned an electrical conduit system that would provide maximum flexibility for all future wiring needs --and they installed Youngstown BUCKEYE CONDUIT, as this picture shows.

For maximum flexibility in YOUR new post-war wiring jobs, or in jobs replacing wartime emergency wiring, install full-weight rigid steel conduit in such a way as to anticipate all possible future needs and changes.

Youngstown's BUCKEYE CONDUIT, installed in any building, provides a permanent, safe and easy method of increasing or varying wiring circuits at any future time. In fact, BUCKEYE CONDUIT outlasts the buildings in which it is used and gives complete protection against short circuiting or arcing from vibration, dirt, dust, moisture, or corrosion. In exposed spots its rigid, full-weight steel walls protect against crushing or other mechanical damage.

BUCKEYE CONDUIT is preferred by electrical contractors in all parts of the country for its unvarying quality and strength. It will soon be available at all distributors again.

BUCKEYE TRADE MARK YOUNGSTOWN CONDUIT

Ask your distributor for: Youngstown Buckeye Conduit... Pipe and Tubular Products... Sheets... Plates... Electrolytic Tin Plate... Coke Tin Plate... Bars... Rods... Wire... Nails. Tie Plates and Spikes.

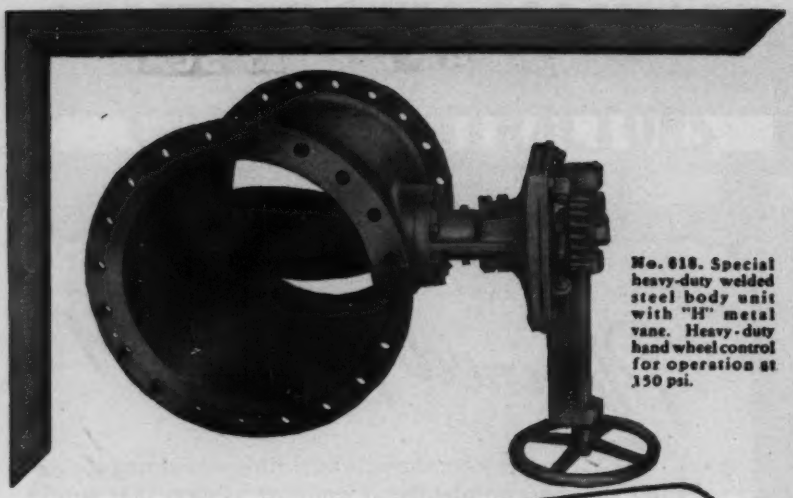
YOUNGSTOWN

THE YOUNGSTOWN SHEET AND TUBE COMPANY

YOUNGSTOWN, OHIO

Manufacturers of

CARBON - ALLOY AND YOLOY STEELS



No. 618. Special heavy-duty welded steel body unit with "H" metal vane. Heavy-duty hand wheel control for operation at 150 psi.

LOW HEAD LOSS SAVES POWER!

All R-S Butterfly Valves have streamlined vanes which offer minimum flow resistance. Flow conditions are similar to those produced in a venturi tube with high pressure recovery on the downstream side. Such a low head loss means a considerable saving in power particularly in large pumping operations.

Furthermore, there are no pockets, right-angle bends or reverse turns to collect sediment. When the vane approaches a closed position, the valve *tends to clean itself.*

Shut-off is accomplished by the beveled vane which wedges against the valve body. *Remember that four to six revolutions of the hand wheel completely open or close the valve vane.* Easily adapted to power operation.

If you are interested in a simplified and less costly method of control and shut-off, write. Ask for Catalog No. 14-B.

15 to 900 psi. Control and shut-off of volume and pressure for air, gas, steam, liquids and semi-solids.

No. 617. Electric motor control for extremely slow acting valve. Hand wheel for manual operation on gear reduction drive. Extended lever for operation of sister valve in parallel line.

VALVE DIVISION
R-S PRODUCTS CORPORATION
116 Berkley Street • Philadelphia 44, Pa.

R-S Streamlined BUTTERFLY VALVES

field, Tex., has been made manager of the plant. He succeeds the late Ben J. Harlan.

LEVINSON STEEL SALES CO., of Pittsburgh, Pa., has been appointed exclusive distributors for Bates Grates—Open Flooring and Stair Treads—manufactured by Walter Bates Co., Joliet, Ill. The Levinson organization will handle distribution in the Pittsburgh District and in certain sections of Ohio and West Virginia.

THE PHILIP CAREY MFG. CO., Cincinnati, Ohio has announced the appointment of C. B. Pooler as vice president in charge of manufacturing.

Born in Fort Dodge, Ia., Mr. Pooler has spent practically all his life in the building material industry. An electrical and mechanical engineer, he has served as production manager, plant manager, division operations manager, manager of labor relations in plants producing fabricated steel, metal lath, insulating board, roofing, paints, paper, asbestos and gypsum products.

C. H. LAGE has been appointed general works manager of LaPlant-Choate Manufacturing Co., Inc., Cedar Rapids, Ia., builders of earth-moving and road machinery. He will have charge of all plant operation and production. Mr. Lage went to LaPlant - Choate from Universal Unit Power Shovel Corp., of Milwaukee, Wis., where he was vice-president in charge of manufacture. He was also works manager of the Davis Thompson Co., controlled by the same interests as Universal.

For 12 years prior to 1941, Mr. Lage served with Caterpillar Tractor Co., as factory division superintendent in charge of the parts machine shop, the manufacture of special attachments and the assembly of attachments and equipment sent by allied manufacturers to Caterpillar. Later for nine years he was in charge of planning.

MARTIN NOACK has been appointed district manager on the west coast for The Fibre Conduit Co., Orangeburg, N. Y. His headquarters will be in San Francisco. For the past 10 years Mr. Noack has been associated with a

BIG DEMAND MAY MAKE POST-WAR DIESELS SCARCE!
ORDER YOURS NOW! USE

Sheppard DIESEL Post-Priority Plan...

One installation demonstrating Sheppard Diesel economy and dependability was described in this advertisement—appearing in the June 29 issue of this magazine.

Sheppard will notify you *of delivery date. Ten days after receipt of this notice,* your tentative order becomes binding.

Using the Sheppard Post-Priority Plan is simply thinking ahead to safeguard your future. Why risk being unable to obtain Diesels at a time when you may need them critically? Write today for your tentative order blank.

IT COSTS ONLY A PENNY NOW TO BE SURE OF A DIESEL LATER

WHEN THIS WAR ENDS, industry will need Diesels . . . plenty of them . . . as promptly as they can be obtained. But this very need for Diesels may make them hard to get.

Protect yourself! Order your Diesels now . . . through the Sheppard Post-Priority Plan.

No Guessing About the Future . . . No Involved Procedure

The operation of the Sheppard Plan is simplicity itself. You're not asked to guess the future. There's no involved ordering procedure.

You simply fill in the coupon at right stating your estimated Diesel needs. Sheppard engineers will make a recommendation suited to your requirements. This recommendation will be accompanied by a post-priority tentative order blank.

Once this order blank is returned, your name is placed on a special preference list. Names on this list will be given first claim on post-war Sheppard Diesels.

As soon as it is possible to place your order in production,

PASTE COUPON ON POSTCARD

R. H. SHEPPARD COMPANY
104 MIDDLE STREET, HANOVER, PA.

Please have your engineers submit a recommendation for my power needs as specified below. I understand there is no obligation for this recommendation. Also enclose a Post-Priority tentative order blank.

.....H.P. Diesel required for.....

Remarks.....

.....

(IF ABOVE SPACE IS NOT AMPLE, PASTE COUPON ON LETTERHEAD.)

Company .....

Address.....

.....

By..... Title .....

Sheppard AMERICAN DIESELS

SIMPLE MECHANICAL COUPLER
SPEEDS INSTALLATION

RIC-WIL PREFABRICATED INSULATED CONDUIT

for piping steam, oil or process liquids

Conduit Ends Expanded Smooth to Facilitate Tight Closure

Special machines at the factory remove corrugations from ends of conduit for a distance of 3", so that coupler sleeves will make a positive, watertight closure when units are joined in the field. Prefabricated expansion loops, elbows and tees also have ends expanded smooth for joining with straight units. The result is a permanent, pressure-tight system, requiring no maintenance.

Field assembly of Ric-wiL Prefabricated Insulated Pipe Units has been greatly simplified by a drive coupler, minimizing the need for skilled workmen, and still further reducing installation time. After pipes are coupled or welded and insulation applied, a split connector sleeve is slipped over the opening. Clamps are driven in place (see illustration) drawing the coupler tightly over conduit ends, from which corrugations have been removed at the factory. An asphalt blanket is then applied with heat over the entire uncovered area.

Saves Time and Labor If Welded Closure is Required

The combination of smooth, round expanded ends and drive coupler makes possible a strong, tight welded connection with a minimum of field labor. Clamps are first driven on channels, holding coupler firmly in place while circumferential seams are welded. Clamps are then removed, and longitudinal seam welded.

Write for the new Ric-wiL Catalog

RIC-WIL INSULATED PIPE CONDUIT SYSTEMS
THE RIC-WIL COMPANY · CLEVELAND, OHIO
AGENTS IN PRINCIPAL CITIES

distributor of Orangeburg fiber conduit underground raceway for electric cable companion product to Orangeburg fiber pipe.

WILLIAM HOGAN, Augusta, Ga., formerly associated with Georgia Iron Works, is now Hydroseal pump engineer for the Allen-Sherman-Hoff Co. and will cover the southeastern states.

J. C. Tyger, formerly with Pomona Pump Division of Joshua Hendy Iron Works, also is now Hydroseal pump engineer. Mr. Tyger will cover the mid-western states with headquarters at 407 South Dearborn St., Chicago, Ill.

CLARENCE W. PEARSON has been appointed plant superintendent of Rodgers Hydraulic, of Minneapolis, according to John L. Rodgers, president of the company. Mr. Pearson was formerly connected with the Twin Cities ordnance plant.

S. J. PERLOW, formerly associated with Johnson, Drake and Co. on Army base construction projects in Eritrea and Egypt, has been appointed eastern manager for the Davey Compressor Co., Kent, Ohio. After foreign service in the army during World War I, Mr. Perlow attended the Massachusetts Institute of Technology, and since then has devoted many years to air compressor and air tool engineering, installation and sales in the New England and New York territories. His office is at 330 West 42d St., New York City.

HARRY A. FENNERTY has been elected president of the Alliance Machine Co. A director and also president of the Alliance Structural Co., he succeeds his father-in-law, W. H. Purell, founder of the company 43 years ago, who died recently. G. W. Shem is chairman of the board.

JOHN W. KENNEDY, 46, general sales manager of the Huron Portland Cement Co., died in Detroit, Mich., on July 29. He went to Huron 16 years ago as technical sales director.

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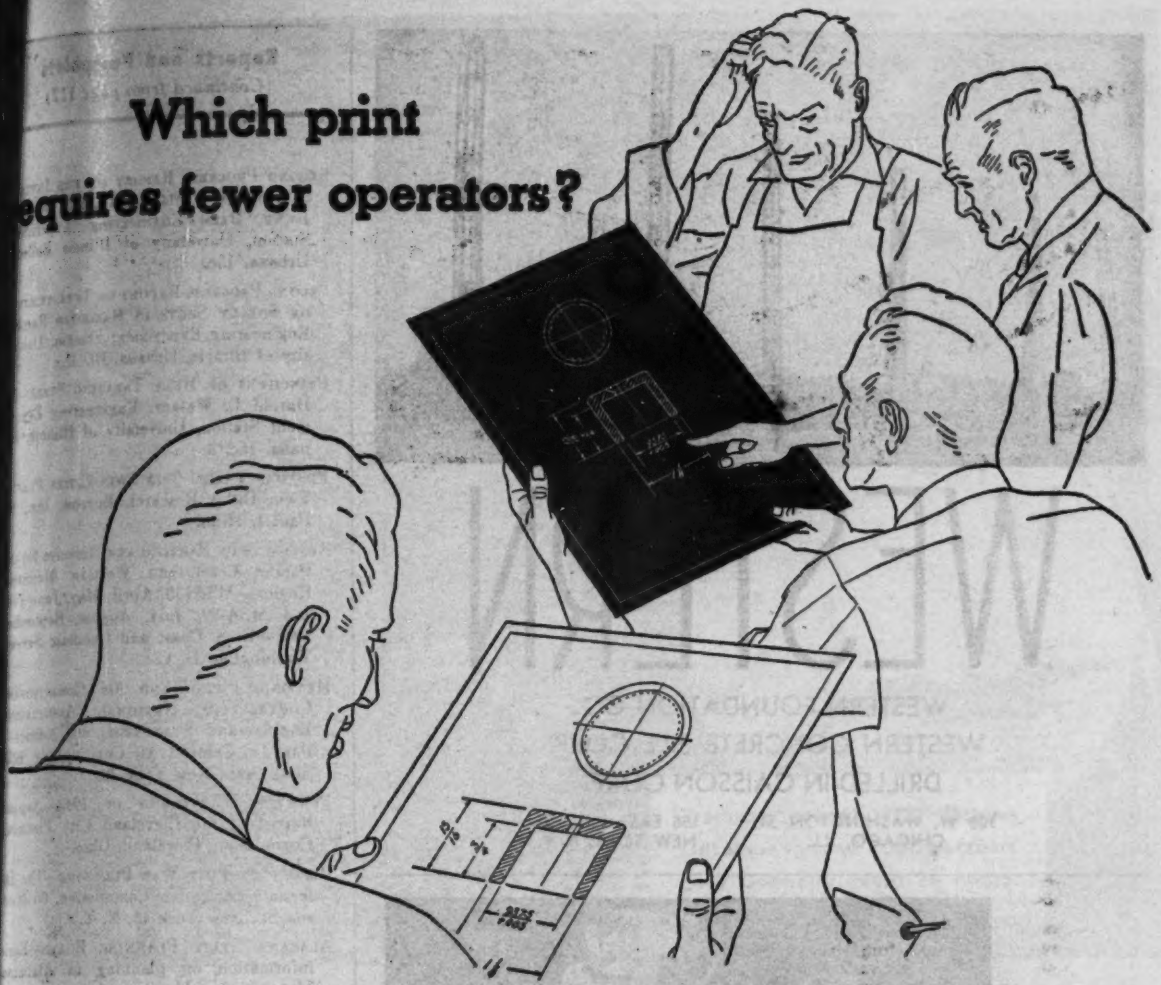

IT TAKES two or three experienced operators to make blue prints on a large blue print machine. But Bruning Black and White (black line) Prints can be made in comparable quantities with *one* inexperienced operator.

The Bruning BW process, you see, is far more simple than blue printing. Making a BW Print involves only *two* steps—exposure and developing—instead of the five production steps that blue prints require. BW Prints are developed instantly and delivered dry. BW Prints can be made on sheets cut to the size of your tracings—as well as continuously from roll stock. And because of their black lines on white backgrounds, BW Prints are much easier to read—far easier to check—than blue prints.

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Reports and Pamphlets

(*Continued from page 112*)

SECOND PROGRESS REPORT OF THE INVESTIGATION OF FATIGUE FAILURES IN RAIL JOINT BARS—Engineering Experiment Station, University of Illinois Bulletin, Urbana. 15c.

SECOND PROGRESS REPORT ON INVESTIGATION OF SHELLY SPOTS IN RAILROAD RAILS—Engineering Experiment Station, University of Illinois, Urbana, Ill. 15c.

PRINCIPLES OF HEAT TREATING STEEL—By Harold L. Walker. Engineering Experiment Station, University of Illinois, Urbana. 15c.

POSTWAR TAXES: THE TWIN CITIES PLAN—Twin Cities Research Bureau, Inc., St. Paul 1, Minn.

ABSTRACTS OF EARTHQUAKE REPORTS for the Pacific Coast and Western Mountain Region—MSA138, April, May, June 1943 and MSA-39, July, August, September 1943—U. S. Coast and Geodetic Survey, Washington, D. C.

HEATING, PIPING AND AIR CONDITIONING CONTRACTORS NATIONAL ASSOCIATION ENGINEERING STANDARDS, 4th Edition—Part IV, Comfort Air Conditioning. 1256 Sixth Ave., New York 20.

PLANNING CLEVELAND IN 1943—Annual Report of the Cleveland City Planning Commission, Cleveland, Ohio.

REPORT ON POST WAR PLANNING—The Interstate Sanitation Commission, 60 Hudson St., New York 13, N. Y.

ALABAMA STATE PLANNING BOARD—Basic information on planning in Alabama. Montgomery, Ala.

POST-WAR RECONSTRUCTION COMMITTEE—Interim report to the Legislature of Alberta, March 10, 1944.

LOUISIANA PUBLIC WORKS—Biennial Report, State of Louisiana, Department of Public Works, 1942-1943, Baton Rouge, La.

PLAN FOR PUBLIC RECREATIONAL AREAS—City Plan Commission, St. Louis, Mo.

SUPPLEMENTARY REPORT OF THE POST-WAR REHABILITATION COUNCIL, Victoria, B. C.

HONOLULU, Hawaii—Annual Report of the Department of Public Works of the City and County of Honolulu, 1943.

RICHMOND, Virginia—Annual Report, Director of Public Works, 1943.

THE QUEBEC STREAMS COMMISSION, 1940—29th Report.

THE QUEBEC STREAMS COMMISSION, 1941—30th Report.

PROCEEDINGS OF THE FIRST ILLINOIS STATE ASPHALT CONFERENCE—(Limited edition.) The Asphalt Institute, New York 17, N. Y.

SOME BASIC REDEVELOPMENT PROBLEMS, 2nd Public Report—New York Chapter of the American Institute of Architects, 115 E. 40th St., New York.

ANNUAL REPORT, City Planning Commission, Pittsburgh, Pa., 1943.

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dedicates one of the world's largest 100-Octane and Butadiene Plants

WITH THIS giant plant at Lake Charles, Louisiana, Cities Service, in cooperation with the Government, takes a tremendous stride toward meeting two most vital war needs.

Sired by the necessity of War, the plant means more power to the armed forces, for it turns out great quantities of high-octane aviation gasolene and ingredients for synthetic rubber.

Created from the ground up, it includes the very latest discoveries and inventions; and it is wholly dedicated to bringing the War to an earlier close. This great accomplishment is an outstanding example of what can be achieved by the winning team of Government and Industry . . . working together, shoulder to shoulder, in the battle for Freedom and Peace.

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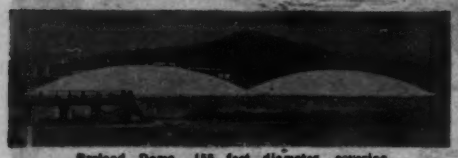

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That means that Wheels — good Wheels — are a vital part of your assembly. Let our Engineers show you how to make the most of the good Wheels we can produce for you. Write today for complete Illustrated Bulletins, covering wheels of every type — for every need.
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APPROVED STATE AND MUNICIPAL PROJECTS—New York State Postwar Public Works Planning Commission, Albany, N. Y., July 1, 1944.

VIBRATION STUDIES OF CONTINUOUS SPAN BRIDGES—By Louis Edmond Vandegrift. Engineering Experiment Station, Bulletin No. 119. Ohio State University. $1.

RESULTS OF PUBLICLY OWNED ELECTRIC SYSTEMS, 1944—8th Edition. Burns & McDonnell Engineering Co., Kansas City, Mo. $10.

STATE OF NEW JERSEY—Board of Public Utility Commissioners, Statistics of Utilities, private and municipal, for the year 1938-1939-1940.

MEN AND JOBS

Maj. Frank Woodbury Jones has returned to his work as an active partner in Havens and Emerson, Cleveland, Ohio and New York. For the past 15 months Major Jones has been serving as a reserve officer of the United States Public Health Service under particular assignment. This work has been completed and Major Jones has been placed on inactive status.

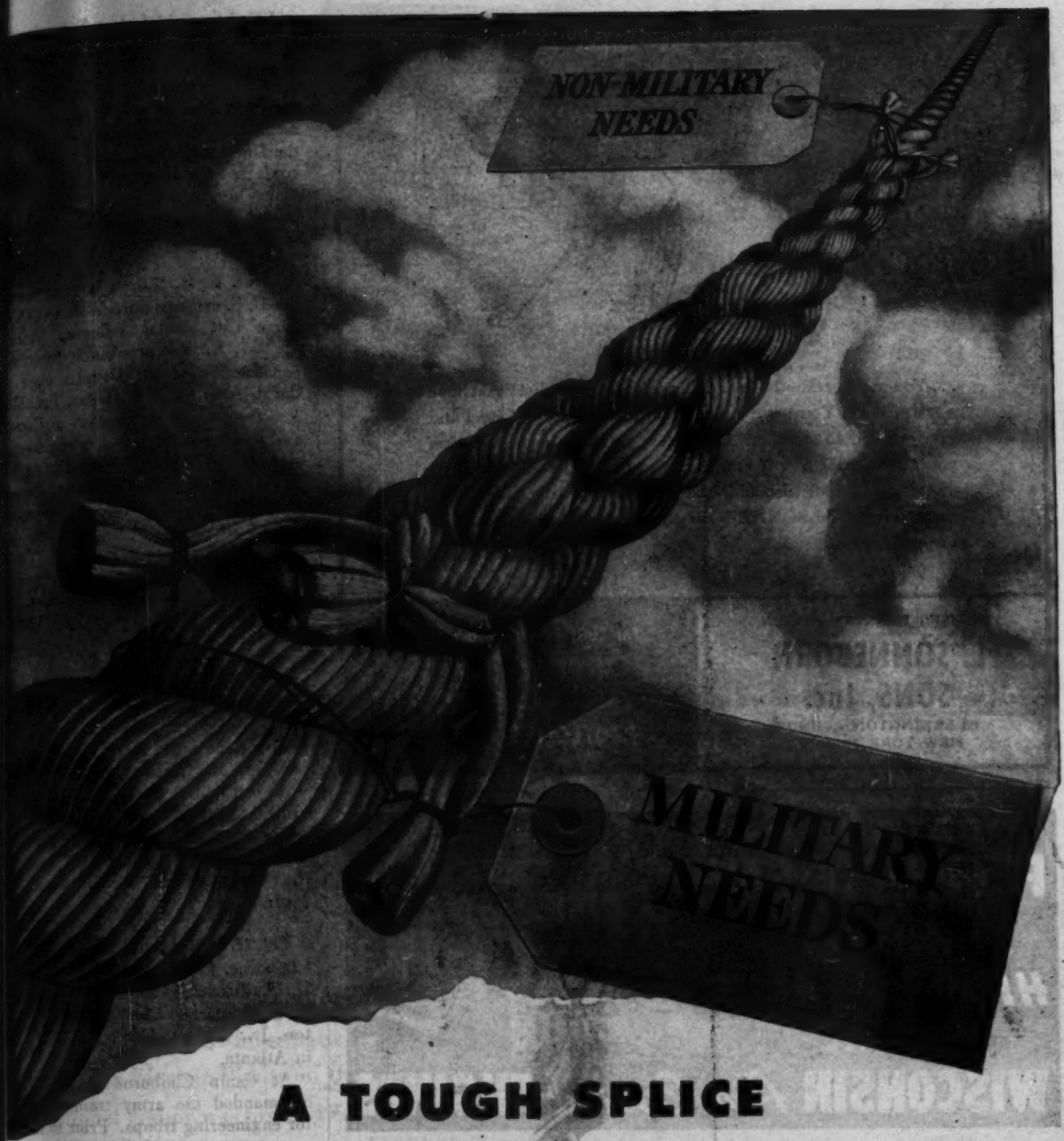
Thadeus D. Sadler of Raleigh, N. C., recently was promoted to the rank of major at Craig Field, Selma, Ala., where he is serving as supervisor of maintenance. Commissioned in the Army in March, 1942, he also has served as base engineer officer at Craig Field.

W. L. Hill, of Sharon, S. C., has been elected South Carolina state highway commissioner for the sixth judicial circuit. He succeeded J. G. Jordan of Bacomville, whose term expired.

The Portland Cement Association has announced the appointment of **W. Wayne Wallace** as district engineer in charge of its Chicago district office. He will have charge of association activities in Illinois with headquarters at 33 West Grand Avenue, Chicago.

E. G. Kastenhuber, Jr., has declined reappointment to the office of Town Engineer of Easton, Md. His fourteenth consecutive term, covering a period of twenty-eight years, ended on June 1. Mr. Kastenhuber will devote his entire time to his private practice as a civil engineer and land surveyor, under the firm name of Kastenhuber & Anderson, which he established in Easton in the summer of 1913.

Col. George Fenn Lewis, now on terminal leave from the Army, has been awarded the Legion of Merit for service in the Office of the Chief of Engineers,



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and assistant chief of staff, supply and services, Air Transport Command.

Clifford Johnson, bridge engineer of the North Dakota state highway department, was honored by his alma mater, the University of North Dakota, when it conferred the Degree of Civil Engineer upon him recently. Mr. Johnson received his degree of Bachelor of Science in Civil Engineering in 1921.

Lieut. E. B. Wilson is in charge of the U. S. army engineer's office at Oklahoma City, Okla., following transfer of **Maj. E. A. Cornell,** who supervised construction of the Douglas plant, to the division office at Dallas, Tex. Wilson formerly was assistant to Cornell and more recently was area engineer assigned to Dalhart, Tex. During his three-year stay in Oklahoma, Cornell supervised the spending of millions of dollars in war plant construction.

Herbert R. Pirkner, recently with The Austin Co. in New York city, has rejoined The Port of New York Authority, where he is now assistant engineer in the design division.

Edward G. Webster, Little Rock, Ark., has been chosen as planning engineer for the Little Rock Planning Commission. Mr. Webster, now working on a project known as the Knoxville Plant at Oak Ridge, Tenn., was at one time with the Arkansas State Planning Board and from 1935 to 1937 was with the Resettlement Administration in Little Rock.

Col. H. L. Robb has gone from Camp Claiborne, La., to assume the duties of U. S. district engineer at Charleston, S. C., to succeed **Lieut. Col. J. W. Patton, Jr.,** who goes to the division office in Atlanta.

At Camp Claiborne Colonel Robb commanded the army training service for engineering troops. Prior to that he served overseas. Colonel Patton succeeded Colonel Ira F. Bennett as district engineer June 4, 1943, having gone there in November, 1941, from Mississippi, as assistant district engineer.

Capt. Ambrose DeWitt Howell, Badin, N. C., for 4 years in active service in the U. S. Corps of Engineers, has been assigned to the research department of the Engineer School at Ft. Belvoir, Va.

J. W. Stevens, Jr., designing engineer, road design division of the Texas Highway Department, has resigned to accept an instructorship in the University of Texas. Stevens has been with the Texas Highway department since his graduation from the University of

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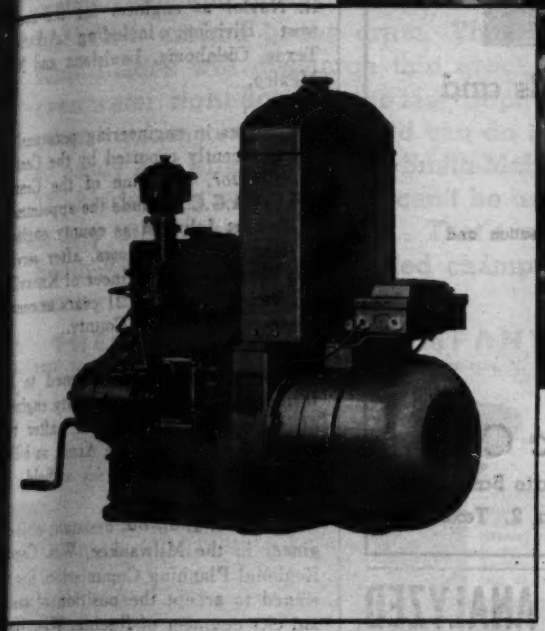

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Kohler Electric Plants are backed by many years of manufacturing experience. Their quality and dependability have become a standard with contractors and engineers the country over.

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These superb performers, modern in every respect, stamina-built and lasting, will deliver the low cost haulage required to justify your competitive bids.

Behind these easy-to-handle and completely responsive haulage units are more than forty years of fine locomotive building culminating in a proved record of performance on the exacting duties of war on every front.

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Lt. Col. Stephen R. Hammer, d trict U. S. Engineer at Denver, has a nounced the assignment of Capt. Robe K. Morrell as resident engineer charge of extensions of the Cheyen Wyo. airport runways.

Brig. Gen. Edwin Hall Marks h been appointed to succeed Col. Robe R. Naylor as engineer for the Sout west Division, including Arkans Texas, Oklahoma, Louisiana and Ne Mexico.

Changes in engineering personnel Iowa, recently reported by the *Centr Constructor*, magazine of the Centr Branch A.G.C., include the appointme of **Robert Johnson** as county engine of Hardin County, Iowa, after servi two years as city engineer of Knoxvill Ia., and the previous 21 years as coun engineer for Marion County.

Mark Hargis has returned to h former duties as assistant city engine of Oklahoma City, Okla., after t years active duty in the Army as bille ing officer at Hondo Army airfield.

Norval C. Johnson, assistant civil e gineer in the Milwaukee, Wis. Coun Regional Planning Commission, has re signed to accept the position of assi ant city engineer of Racine, Wis. He a graduate of the Civil Engineerin School of Marquette University, 192

W. T. Williamson, town manager Apex, N. C., has been named town ma ager of Bloomfield, Conn., to succe John P. Ramsey of Hartford, Co Williamson was graduated from th North Carolina State College School Engineering in 1931, and served f seven years as a government engine prior to becoming town manager Apex.

James A. Lindsey, member of th Civil Engineer Corps, USNR, station in the New York City area, was recen promoted from ensign to lieutena junior grade. Lieut. Lindsey, a civ engineering graduate of the Univers of Minnesota in 1939, was employed b the Bureau of Reclamation at Denve Colo., for four years before enterin naval service.

Sidney Weniger, civil engineerin graduate of Cooper Union Institute Technology in 1941, has entered the U S. Navy as ensign, USNR for assig ment as engineering officer on constru tion. He expects to be assigned event ally to a ship repair unit overseas or

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Smith-Mobile patented "T" shaped blades knead and mix the driest batches . . . concrete so stiff that most truck mixers would just roll it around in the drum. Then the same blades will discharge thin grout, or even water, right down to the last drop. No other truck mixer in the world can do this so easily and efficiently. The Smith-Mobile "T" blades are patented and can't be used in any other truck mixer . . . That's why Smith-Mobile is the undisputed champion among truck mixers.

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Photo: Assembling stern section of Navy Tank Landing Craft

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a repair ship. From July, 1941, to February, 1942, he worked with Drydock Engineers, Inc., New York, on the design of naval graving docks. Since February, 1942, he has been with the U. S. Navy Department. Following four months of special study at M.I.T., he has worked in the scientific section of the New York Navy Yard as naval architect on design, construction and repair of naval vessels.

First Lieutenant W. J. Heard has just been appointed assistant to the district engineer of the U. S. District Engineer Office at Wilmington, N. C., according to an announcement by Lt. Col. N. W. Haner, acting district engineer.

A native of Bedford, Ind., Lieutenant Heard was employed by the Indiana State Highway Commission prior to entering the Corps of Engineers in September, 1942. Since entering the Army he has seen service at Bluethenthal Field, Fort Bragg, Winston-Salem, Greenboro, Raleigh and Durham, all in North Carolina.

A. Stuart Collins, consulting engineer, has announced the formation of a partnership with his associate **John A. Beans** to continue the practice of engineering under the name of Collins & Beans, consulting engineers, with the collaboration of their associate **John Y. Sloan,** architect, at 232 Delaware Avenue, Buffalo 2, New York.

Julian Montgomery, former Texas state highway engineer and now of Austin, Tex., has been hired by the City Commission of Temple, Tex., to formulate a master plan for the future development of the city for the next 15 years. Montgomery presented his preliminary survey for the master plan to the city officials on May 19. He estimates that it will take him six months to complete the job.

Felix S. Hales, of Cleveland, Ohio, a native of Wilson, N. C., has just been named assistant to the president of the Nickel Plate Railroad. He formerly was assistant superintendent. Hales received his degrees in civil engineering from North Carolina State College and Cornell University.

Col. Brendan A. Burns, C. E., was given an "oak leaf cluster to bronze star medal" for "Heroic achievement in connection with military operations against the enemy as garrison force engineer on Kwajalein Island from February 1 to February 15, 1944. Charged with the responsibility of developing an air base on the island, he participated in the initial landings and, disregarding his

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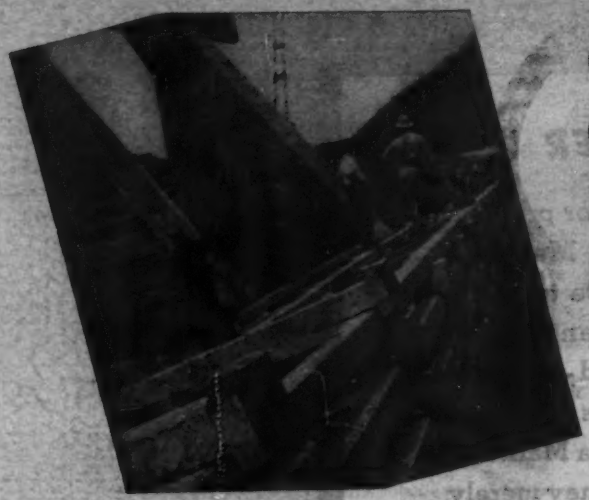

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No forms, no skilled labor, no special equipment required for this fast, economical construction that is widely adaptable. Minimum foundation excavation, dumped as fill in section adjoining!

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personal safety, quickly made a rec... naissance of areas exposed to ho... fire in order to facilitate the land... of essential heavy equipment for ... ployment in airfield construction. ... personal enterprise and techn... knowledge effectively contributed to ... beginning of airfield construction bef... the island was completely captured, ... its rapid completion for combat ope... tion."

Captain Charles Crotty, former ass... ant port director for the Harris Coun... Houston Ship Channel Navigation Di... trict, has been made research engin... to improve the Houston Tex., port a... ship channel. His studies will inclu... A communication system to facili... passing, holding, operating and ... patching vessels; reports on all navi... ble streams in the district, giving ... strictions regarding railroads, brid... operations, and utility lines; a high... system including tunnels, overpas... and underpasses; studying flood cont... of the San Jacinto River; and locati... large industries that do not have to h... deep water terminals.

Two new additions to the staff of Go... nett Fleming Corddry and Carpen... Inc., engineers of Harrisburg Pa., ... **H. R. Moffit,** formerly deputy co... missioner of highways of Pennsylvan... and **Odd Albert** of Belmar, N. J., w... has been consulting structural engin... on important government jobs.

Eugene Breen, member of the Seat... Wash., city engineering department ... 42 years and executive secretary of ... city planning commission since 19... retired from service in July at the a... of 67.

A native of California, Mr. Breen w... graduated from Santa Clara Univers... and received a degree in engineer... from Stanford University in 1901. H... ployed originally by Seattle as dra... man, he rose to the position of ass... city engineer before being appointed

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the planning commission. Henry R. Berg of the city engineering department has been named Breen's successor.

LeRoy Petersen, who for the past several months has been the Muskegon, Mich., representative for the Committee for Congested Production Areas in the Executive Office of the President (ENR May 18, p. 119) has now had the supervision of the Detroit-Willow Run area also put under his jurisdiction. He replaces **Frank McLaury**, who is returning to his regular position as deputy controller for the city of Detroit.

Rowland D. Schnell has been appointed director of the Treasury Procurement Division and Surplus Property Section, Region No. 4, with headquarters in Cincinnati, Ohio. He will be in charge of surplus construction equipment (ENR May 18, p. 721.)

Mr. Schnell entered government service in 1942 as regional OPA rent executive in region No. 3 where he set up the entire rent control program in Ohio, Michigan, Indiana, West Virginia and Kentucky.

G. B. Alexander has been named district engineer for Saskatchewan for the Canadian Pacific Railroad.

George Schermer, administrative assistant of the Detroit Housing Commission, has been appointed director of the Detroit district of the Federal Public Housing Administration, succeeding **Sherwood L. Reeder**, who became Cincinnati city planner.

Horace Waldo Fleming has been appointed district engineer of the Northern Ontario section of the Canadian National Railways, with headquarters at North Bay, Ont. He succeeds **C. H. N. Connell**, who retires from active work after many years of service with the C.N.R. Mr. Fleming is a native of Liverpool, Nova Scotia, and began his railway career as a rodman at Colborne, Ont.

Edward D. Gill of Wake Forest, N. C., formerly connected with the North Carolina Highway and Public Works Commission, has been promoted to captain with the Army Engineers at Camp Claiborne, La.

J. M. Kellogg has resigned as president of Nick F. Helmers, Inc., New York, and is no longer associated with the firm. He was elected president after the death of Nick F. Helmers and completed, as project manager, Army and Navy work in the Arctic, contract for which was held jointly with McWilliams Dredging Co.

Mr. Kellogg was formerly vice pres-

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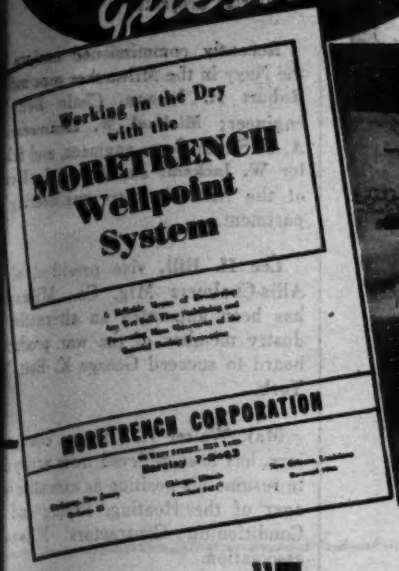

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ident and chief engineer of Nick H... Helmers, Inc., and held the same po... tion with Siems, Helmers, Inc., havi... been associated with these two firm... for 24 years. During this time he wa... in charge of a number of construct... projects, among them the river pi... of the Mississippi River bridge at N... Orleans, La., submarine rock remov... in San Francisco Bay and the Columbi... River channel, and numerous hydro a... steam power plant developments a... industrial projects.

Recently commissioned ensigns f... the Navy in the Milwaukee area inclu... **Robert H. Knapp**, Chain Belt C... engineer; **Michael W. Zimmerman**... A. O. Smith Corp. engineer, and Schu... **ler W. Jackson** and **Alfred L. Mont**... of the Allis-Chalmers engineering d... partment.

Lee H. Hill, vice president of t... Allis-Chalmers Mfg. Co., Milwauk... has been appointed an alternative i... dustry member of the war productio... board to succeed George K. Batt, N... York.

Maj. Walter H. Oleson, coast art... lery, has been relieved from active du... to resume his position as executive ma... ager of the Heating, Piping and A... Conditioning Contractors' Milwauk... association.

Norval Johnson, assistant engineer ... the Milwaukee county planning depa... ment for the last sixteen years, has be... appointed assistant city engineer ... Racine, Wis.

H. P. Reading, formerly in charge ... one of the municipal sewage disp... plants at Durham, N. C., has be... placed in charge of the city's ent... sewage disposal system.

Norwood Michie, Durham, N. C., c... engineer, now is engaged in confide... research in the physics department ... the University of North Carolina ... Chapel Hill, N. C.

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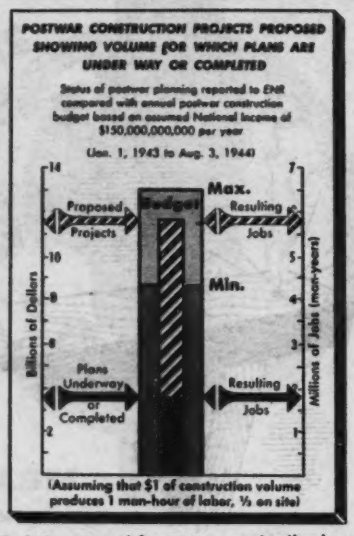
POSTWAR PROJECTS



Projects proposed for postwar construction have been published in these columns since January, 1943, as they have been reported to Engineering News-Record.

Statistics based on these reports are used by the Committee on Postwar Construction of the American Society of Civil Engineers to measure the progress of plans for postwar projects.

The chart above shows, both in estimated dollar volume and in jobs or man-years of labor, how fast this reservoir of future work is filling up.

If you or your community are working on projects that have not yet been included in this "postwar reservoir," please send us an itemized list and description of them, including estimated cost and the names of the engineers who are at work on the plans. Then as you watch the arrows climb you will know that you and your community are contributing to the success of the NUMBER ONE JOB of preparing for peace.

Address your projects list to Manager Business News Department, Engineering News-Record, 330 W. 42nd St., New York 18, N. Y.

MINIMUM SIZE OF PROJECTS PUBLISHED

Public Works	$25,000
Industrial Buildings	40,000
All Other Buildings	150,000

WATER SUPPLY

Ark., Conway—Conway Corp., F. Gordy, bus. mgr., Conway, increase storage capacity of tanks and addn. new mains. Over $15,000. Private plans.

★**Colo., Denver**—City Water Bd., City Hall, Marston Reservoir imprvs., incl. coagulation basins, filter plant units and water storage. $728,250; driving and lining Arrow Tunnel, $55,258; Arrow Tunnel road and transition structures $13,750; Cub Creek Chute, $8,910; Canal to South Ranch Diversion Dam, $9,400; Ranch Creek conduit exten., $800,000; St. Louis conduit near Winter Park, $1,350,000; Vasquez-St. Louis conduit enlargement, $326,000; Montclair Reservoir imprvs., $135,000; complete replacement Conduit 2, $295,000; Moffat Filter Plant addn., $207,000; replacement portions of Conduits 7, 8 and 11, $245,000.

Ill., Bloomington—City, plans underway rearrangement watermains, incl. larger mains and connecting existing mains, hydrants and larger source of supply, $350,000. J. J. Woltman, Unity Bldg., Bloomington and Warren & Van Praag, Inc., 447-450 Standard Office Bldg., Decatur, consult. engrs. S. Wilholt, city engr.; plans 25% completed watermain exten., $18,000, S. Wilholt, city engr.

Ill., Lincoln—Central Illinois Electric Co., Lincoln, preliminary plans underway, new well, equip. change in old well, $20,000; exten. distr. watermains in northwest section, $30,000. R. Kibler, Rockford, engr.

Ill., Jacksonville—City Light & Water Dpt., City Hall, sketch plans underway imprv. water purification sys., at City Water Works, E. Superior St. $25,000. M. A. Clark, City Hall, supt. Light & Water.

Ill., Springfield—City Water & Light Co., City Hall, plans 50% completed addni. watermains to reinforce water distr. sys., 5 mi. southeast of here. $50,000. S. T. Anderson, administrative asst. City Water & Light Co., City Hall, engr.

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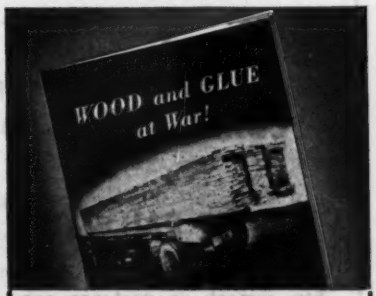

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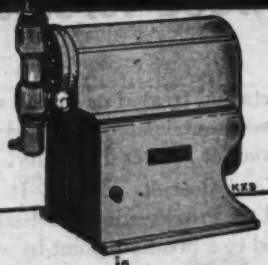

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POSTWAR PROJECTS (Cont'd.)

Ind., Decatur—City, water conditio plant. $75,000 with equip. Financing yet provided for. R. E. Wolf, city eng

Ind., South Bend—City, c/o C. E. Willi engr., several water dpt. extens., var parts of city and suburbs. $100,000.

La., Bogalusa—City, plans completed imprvs., $40,000. Financing not yet prov for. L. J. Voorhies, 3000A Dairymple Baton Rouge, consult. engr.

La., Patterson—Town, plans compl water treatment plant and distr. sys. imp $45,000. Financing not yet provided L. J. Voorhies, 3000 A Dairymple Dr., Ba Rouge, consult. engr.

La., Vinton—Town, preliminary plans c pleted WW imprvs. $32,000. Financing yet provided for. L. J. Voorhies, 300 Dairymple Dr., Baton Route, consult. e

Mo., Dexter—City, WW and sewerage addns., $22,000. Financing not yet provi for. Russell & Axon, 4903 Delmar Bl St. Louis, consult. engrs.

N. Y., Flushing—Bd. Higher Educ., Park Ave., New York, Zone 21. Proj. HN watermains, fire hydrants and sprinkler nections replacing present mains, Queens C lege, Queens Co. $90,000. State Aid Plann Funds allotted.

★**N. C., Gastonia**—City, H. Rutter, W plans underway WW sys. $9 W. C. Platt, Box 971, Durham, consult. en

N. C., Thomasville—City, R. M. Cook mgr. 15,000 ft. 6 in. ci. water line exte $87,500; enlarging coagulation basin to for 2 addnl. filters, equip. for filter pl ext. $300,000.

O., Lorain—City, H. G. Van Wag mayor, steel elevated water storage ta 2 m.g. capacity or storage basin. $ Financing not yet provided for. L. Good city engr.

Tex., Goose Creek—B. B. Williams, G Creek, waterline, for residential proj Over $15,000.

Wash., Seattle—City, County-City Bl plans prepared by Park Dpt., James A. Gl pres., water purifying sys., in Green La involving installation 20 or 24 in. waterm taking fresh water into lake from city wa sys., installing outlet, $25,000.

Wash., Wenatchee—City plans under filtration plant addn. $50,000. J. Dunst city engr.

Wis., South Milwaukee—City, H. Daehling, city clk., WW addn. $250, Consoer, Townsend & Assoc., 211 W. Wack Dr., Chicago, Ill., consult. engrs.

Wis., Stevens Point—City, water di sys. $50,000. B. Fieve, Stevens Point, en

Alta., Mundare—Municipality, WW s $37,000. Provincial Sanitary Engine Branch, Edmonton, engr.

Alta., Peace River—Municipality, WW s $43,500. A. McLure, Pub. Wks. Com Peace River, engr.

Alta., Sylvan Lake—Municipality, WW s $40,000.

Alta., Three Hills—Municipality, WW s $58,000. M. L. Helton, Pub. Utilities Com Three Hills, engr.

Alta., Vulcan—Municipality, WW s $36,000. Provincial Sanitary Engine Branch, Edmonton, engrs.

Ont., Dundas—Municipality, WW develo ment, $40,000.

Ont., St. Thomas—City, Pub. Utilit Comn., P. R. Locke, chn., WW imprvs., in water softening sys., $75,000; new gasoli stand-by pumps, renewing 3 electric pum and imprvs. of pump. station, $35,000; 50 000 gal. water tower, replacing 500 water meters, new hydrants, new water ser ices, etc. Total est. $171,950. J. W. Pea 474 Talbot St., genl. mgr.

SEWERS, WASTE DISPOSAL

Ark., Texarkana—City, sanitary sewera sys. addn. $150,000. P. R. Booker, C engr.

Ill., East Peoria—East Peoria Wate works, 201 N. Main St., plans complet exten. sanitary sewerage sys. in east en of city. $150,000. Legal obstacles to be ove come. L. Kinsey, Pekin, consult. and cons engr. E. Fitzgerald, 327 Park St., Peki city engr.

★**Ind., Decatur**—City, storm sewer $100,000; sewage disposal plant, $400,0 Financing not yet provided for. R. Wolf, city engr.

Ind., New Castle—City, plans 50% com pleted reconstructing sewers $40,000; servic tunnel $3,000; sludge rods, $10,000; pla 21st Street Intercepting sewer, $54,000. Cl Engineering Dpt., City Hall, engr.

★**La., Baton Rouge**—Sewer Dist. 6, Ea Baton Rouge Parish, plans complet sanitary sewerage sys., incl. disposal dilution in Mississippi River, $1,750,0 Financing not yet provided for. L. J. Voo hies, 3000 A Dairymple Dr., consult engr.

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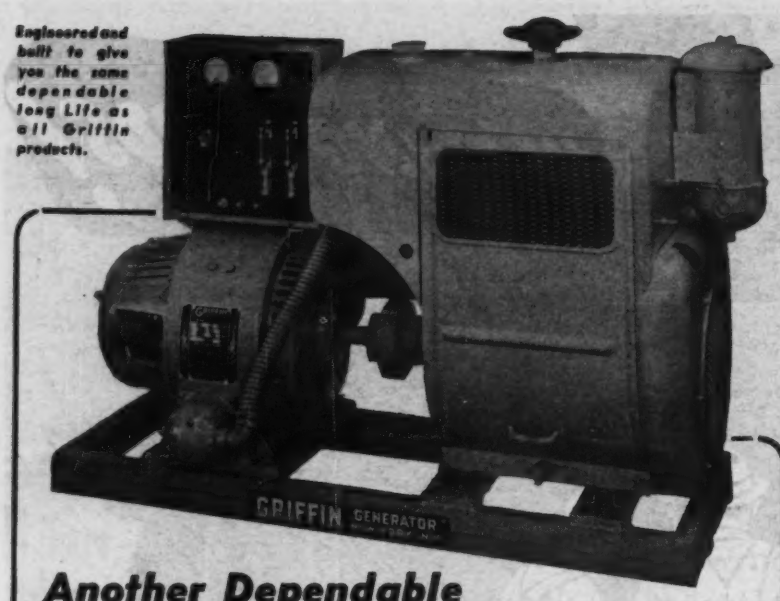

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POSTWAR PROJECTS (Cont'd.)

La., Baton Rouge—Sewer Dist. 8, Ea Baton Rouge Parish, preliminary plans co pleted sanitary sewerage sys., incl. d posal by dilution in Mississippi River, $6 000. Financing not yet provided for. L. Voorhies, 3000 A Dalrymple Dr., cons engr.

La., Baton Rouge—Sewer Dist. 9, Ea Baton Rouge Parish, preliminary plans co pleted sanitary sewerage sys. incl. dispo by dilution in Mississippi River, $50,0 Financing not yet provided for. L. J. Voo hies, 3000 A-Dalrymple Dr., Baton Rou consult. engr.

La., Bogalusa—City, plans completed, sa erage imprvs., $260,000. Financing not provided for. L. J. Voorhies, 3000 A Dal rymple Dr., Baton Rouge, consult. engr.

La., Vinton—Town, plans completed, sa tary sewerage sys. $120,000. Financing yet provided for. L. J. Voorhies, 3000 Dalrymple Dr., Baton Rouge, consult. en

Mich., Detroit—Dpt. Water Supply, Randolph St., heat recovery sys. of wa heat boilers in incinerators at sewage d posal plant. $157,000. L. G. Lenhardt, Randolph St., supt.-genl. mgr. CD 3/11/4 ENR 3/18/43.

★**Mich., Mt. Clemens**—City, preliminar plans sewage disposal plant and int ceptor drain, $250,000 each. Jones & Hen Toledo Trust Bldg., Toledo, O., engrs. 2/25—ENR 3/9.

Mo., Brentwood — City, plans 90% co pleted city-wide concrete storm sewe $250,000. J. B. Heagler, city engr.

Mo., Fulton—City, plans underway enlarging sewage disposal plant. $53,0 Black & Veatch, 4706 Bway., Kansas Ci Mo., consult. engrs. P. D. Thurmond, c engr.

Mo., Harrisonville—City, sewerage exte disposal plant. $98,000. Financing not provided for. Black & Veatch, 4706 Bwa Kansas City, Mo., consult. engrs.

Mo., Monroe City—City, plans sewer exte and disposal plant. $87,000. Land ri not cleared and financing not provided f Burns & McDonnell, 107 West Linwood Blv Kansas City, Mo., consult. engrs. F. Bridges, city engr.

N. Y., Flushing—Bd. Higher Educ., Park Ave., New York, Zone 21, plans und way Proj. HNS-13, reconditioning drainag sys., cement walks, doors, windows and ge eral hardware at stadium, at City Colle $60,000. Felheimer & Wagner, 155 E. 42 Zone 17, archts.

N. Y., Flushing—Bd. Higher Educ., Park Ave., New York, Zone 21, Proj. HNS-12 in. trunkline sewer exten. to location Science Bldg. 1, $25,000; Proj. HNS-3, storm water drainage sys. for grounds, roads a play areas, $35,000, at Queens College, Quee Co., State Aid Planning Funds allotted.

N. Y., New York—President Bronx Boa 851 Grand Concourse, New York, plans und way sewers in E. 224 St., Barnes and Bron wood Aves., etc. (PXS-13) $17,600; E. St. between Barnes Ave. and point easter of Bronxwood Ave. (PXS-14) $16,000; E. St. Barnes to Bronxwood Ave., etc. (PXS-1 $13,000; DeKalb Ave. to 350 ft. south of 212 St. and Bainbridge Ave. (PXS-94) $1 000; E. 219 St. between Barnes and Bron wood Aves. (PXS-9) $8,800; E. 220 St. b tween Barnes Ave., Bronxwood and Pauld Aves. (PXS-10) $8,100; E. 216 St. betwe Barnes and Bronxwood Aves. (PXS-1 $6,700; Pitman Ave. between Wickham a Boyd Aves. (PXS-39) $10,200; Palisade A between Rappock St. and 250 ft. south 231 St. (PXS-40) $22,700; Sedgwick Av between W. 176 and summit south (PXS-9 $12,900; Fordham Rd. between E. 187 and Fordham Rd. (PXS-92) $10,000; C lear Ave. between E. 230 St. and E. Sts. (PXS-93) $14,000; Webster Ave. fr 202 to 204 Sts., etc. (PXS-4) $19,700; 166 St., Morris to Grant Aves. (PXS-2 $14,000; Matthews Ave. between Mor Park and Van Ness Aves. (PXS-35) $8,3

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WAR PROJECTS (Cont'd.)

...ney Ave., Morris Park and Kinsella ...(PXS-30) $6,000; 235 St., Webster to ...(PXS-31) $59,400; Ten...nah Aves., Morris Park to Rhinelander ...k Ave., (PXS-32) $22,200; Washington Ave., ...3 St. to Webster and Washington Aves. ...-33) $20,800; Melrose Ave., E. 162 to ...Sts., etc. (PXS-35) $28,700; Bronxwood ...E. 225 to E. 228 Sts. (PXS-18) ...; Boston Rd. at Eden Terrace (PXS-...,500; University Ave., Burnside Ave. ...(PXS-36) $11,100. Macombs ...ft. south (PXS-26) 700 ft. north (PXS-27) ...Inwood Ave. ...State Aid Planning Funds allotted. ...Dyer, eh. engr.

...Y., New York—President Bronx Boro. ...61 Grand Concourse, plans underway ...E. 175 St., between Webster and ...ington Aves. (PXS-29) $36,300; Brun... Ave. between Bartow and Adee Aves. ...-130) $20,000; Morris Park, Barnes and ...Neer Aves. (PXS-130) $31,000; Wales ...(PXS-121) $32,500; Needham Ave. E. ...to Mickle Ave. (PXS-20) $23,200; Hill ...Edenwald and Bussing Aves. (PXS-...,400; Clay Ave. between E. 165 to ...St. (PXS-128) $7,000; Walton Ave., ...70 to 171 Sts. (PXS-129) $6,000; Adee ...from White Plains Rd. to Barker Ave. ...-122) $7,000; Dewey Ave., from ...ers Neck to Logan Ave. (PXS-124) ...; Throop Ave. between Burke Ave. ...Gun Hill Rd. (PXS-125) $24,600; W. ...St. Post Rd. to Tibbett Ave. (PXS-119) ...; Prospect Ave., 176 to 175 Sts. (PXS-...,400; Cambridge Ave. between W. 235 ...W. 236 Sts. (PXS-120) $5,500; Truxton ...between E. 156 St. and Worthem Ave. ...-121) $11,200; E. 134 St. between Web... Ave. and N. Y. C. R. R. (PXS-122) ...; Reservoir Oval between Bainbridge ...Wayne Aves. (PXS-113) $11,500; Ely ...between 232 St. and unnamed street ...-114) $17,300; Secor Ave. between E. ...St. and city line (PXS-116) $15,400; ...field Ave. from 231 to 230 Sts. (PXS-...,000; West 256 St. from Sylvan Ave. ...Fieldstone Rd. (PXS-118) $21,200; Still... Ave. from Vance to Astor Aves. (PXS-...,000; Pelham Pkwy. South and Burr ...(PXS-110) $68,900; Edsall Ave. be... Bradley Terrace and unnamed street ...-41) $62,500; Fairfax Ave. between Lay... and Fairmount Aves. (PXS-115) $84,400; ...Bay Ave. from Hunts Point Ave. to ...St. (PXS-50) $46,900; E. 214 St. from ...ia to Paulding Aves. (PXS-7) $7,400; ...nside between Waring and Mace Aves. ...-1) $6,600; Schley Ave. from E. 177 St. ...Tremont Ave. (PXS-45) $5,800; Nether... Ave. between W. 259 and 256 Sts. ...-111) $22,900; Paulding Ave. from E. ...to 213 Sts. (PXS-8) $11,900; Astor Ave. ...een Tremont and Mickle Aves. (PXS-...,300; Kingsland Ave. between War... and Mace Aves. (PXS-2) $11,600; Ever... Ave. from Story Ave. to Eastern Blvd. ...-103) $13,200; Ward Ave. (PXS-42) ...; Seminole St. between Stillwell and ...chester Aves. (PXS-104) $5,300; Robin... Ave. between East River and Schers Ave. ...-49) $15,900; Williamsbridge Ave. be... Lydig Ave. and Pelham Parkway ...h (PXS-107) $7,000; Paulding Ave. from ...to 219 Sts. (PXS-6) $7,900; Mosholu ...way between Bainbridge and Hull Aves. ...-5) $12,800; Tiemann Ave. between Al... Ave. and Gun Hill Rd. (PXS-1) ...; Merritt Ave. from E. 233 St. to city ...(PXS-97) $13,500; Samson Ave. be... Baxter and Revere Aves. (PXS-101) ...; Burke Ave., Laconia to Throop ...(PXS-43) $81,500; Seward Ave. from ...ley to Leland Aves. (PXS-42) $99,600; ...ding Ave. between E. 177 St. and Penny... Ave. (PXS-46) $55,100; Harding Ave. ...E. 177 St. to Prentis Ave. (PXS-47) ...State Planning Funds allotted. ...Dyer, eh. engr.

...C., Gastonia—City, H. Rutter, mgr., ...underway sewage collecting sys. ...W. C. Platt, Box 971, Durham, ...engr.

...C., Thomasville—City, 20,000 ft. 8- to ...sewer exten., $32,000; enlarging sewer... disposal plants, $45,000. R. M. Cooksey, ...gr.

...O., Akron—City, plans underway imprv. ...Betrum sewage disposal plant, construct... addn. and incinerator. $5,100,000. Havens ...merson, Leader Bldg., Cleveland, consult. ...CD 9/16—ENR 10/17.

...O., Fostoria—City, H. M. Wanzer, serv... dir., combined sewers. $500,000.

...O., Lorain—City, H. G. Van Wagenen, ...mayor, City Hall, storm and sanitary ...rs in various streets, $2,000,000; sewage ...sposal plant, $370,000. Financing not yet ...vided for. L. Goodell, City Hall, city ...r. CD 8/16—ENR 4/6.

...r., Goose Creek—B. B. Williams, Goose ...k, sanitary sewers, for residential proj... To exceed $25,000.

...Wash., Wenatchee—City, plans underway ...ceptor storm sewer. $55,000. J. Dun..., city engr.

...Wis., La Crosse—City, F. Kramer, clk., ...m sewers, $200,000; sanitary sewers, ...,000; sewage disposal plant, $140,000. ...E. Barth, city engr.

...Wis., South Milwaukee — City, H. W. ...Ring, clk., sanitary and storm sewers. ...,000. Consoer, Townsend & Assoc., 211 ...Wacker Dr., Chicago, Ill., consult. engrs. ...6/15/43—ENR 6/17/43.

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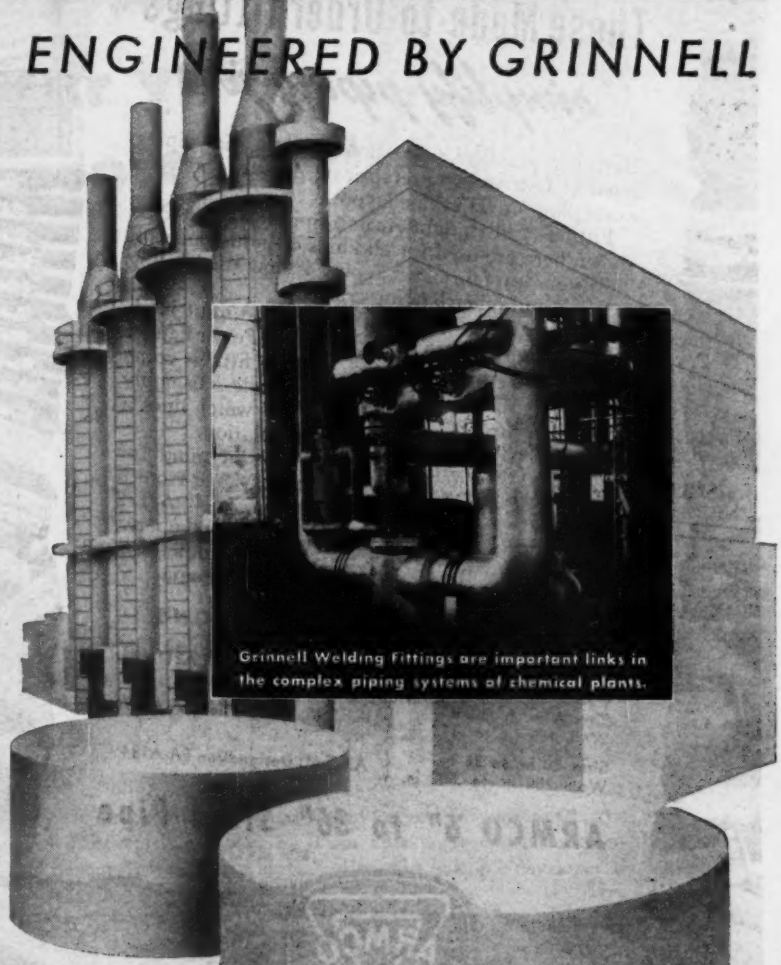

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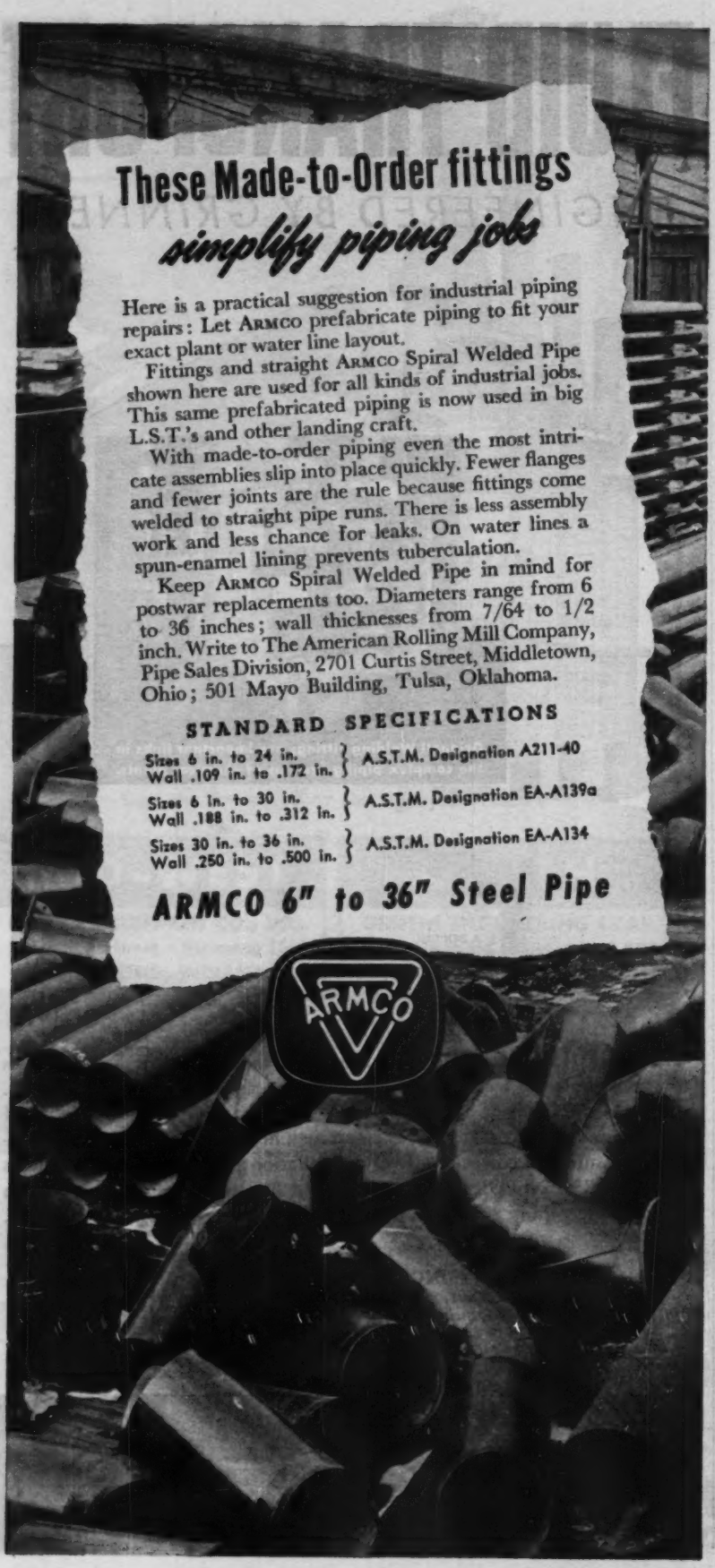
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POSTWAR PROJECTS (Cont'd.)

Alta., Black Diamond—Municipality, ... erage sys. $46,000.

Alta., Coronation—Municipality, ... sys., $40,000.

Alta., Didsbury — Municipality, ... sys. $46,000. Provincial Sanitary ... Branch, Edmonton, engr.

Alta., Peace River—Municipality, ... sys. $45,000. A. McLure, Pub. Wks. ... Peace River, engr.

Alta., St. Paul—Municipality, ... $50,000. Provincial Sanitary ... Branch, Edmonton, engr.

Alta., Westlock — Municipality, ... sys. $29,500.

★**Man., Winnipeg**—Municipality, c/o ... or, G. Coulter, Winnipeg, storm ... Colony area, $714,000; Cornish area, ... 500; Ballentine area, $508,000; Aubrey ... $1,292,000.

Ont., Sarnia—City, extensive sewer ... and paving program, $250,000. C. T. ... low, c/o owner, engr. CD 11/16-11/18.

BRIDGES

Ill., Jacksonville—Morgan Co., ... House, Jacksonville, bridge over Mau... terre Creek, 10B MFT S.A. 2, $1... bridge over Indian Creek, 26B MFT S.... $12,000.

Minn., Brainerd—Crow Wing Co., ... Hagberg, aud., new bridge over Missi... River replacing existing Mill Ave. br... soundings for pier locations have been ... and tentative approach to new bridge ... veyed. $200,000. E. J. Miller, State Hy. ... 1246 University Ave., St. Paul, bridge ... CD 1/10—ENR 1/27.

Minn., Wabasha—Wabasha Co., C... Larson, aud., making plans steel or con... highway bridges in conjunction with ... Hy. Dpt. Over $25,000 (not official). ... King & Day, 1509 Pioneer Bldg., St. ... consult. engrs.

Missouri—State Hy. Comm., Jefferson ... plans 90% completed one 46 ft. I-beam, ... two 18 ft. and two 12 ft. concrete ... spans on Richmond-Lexington Rd.; two ... ft., one 72 ft., four 55 ft., two 52 ft., ... 47 ft. I beam spans on concrete piles ... Wabash & Santa Fe R. R. tracks, ... road, both Ray Co. Est. $50,000.

★**New Hampshire**—State Hy. Dpt., ... cord, plans 2 hy. bridges and 13 mi. ... treated gravel roads in New Durham, Fa... ington and Benton, $575,000; bridge an... mi. bituminous gravel road in Alton, $240,... bridge and 5 mi. paving highway, Bri... Bridgewater, $350,000.

O., Fostoria—City, H. M. Wanzer, ser... dir., City Hall, overhead or underpass ... road grade elimination. $200,000.

Wash., Aberdeen—City, plans 25% ... pleted, 150 ft. steel bascule bridge ... concrete piers, approaches. $75,810. N... Salmon, Aberdeen, consult. engrs.

Wis., Sparta—City, H. L. Beckman, ... City Hall, bridges, $50,000. O. O. Berg... Sparta, engr.

Ont., Hamilton—Municipality, subway ... Canadian National R. R. tracks. $300,... W. L. McFaul, City Hall, engr.

STREETS AND ROADS

Ill., Bloomington—City, City Hall, pl... asphalt on existing brick repaving 7,000 ... Roosevelt St. arterial, McArthur to Sem... ary, 26 ft. wide. $35,000. S. Wilhoit, ... engr.

Ill., Bloomington—Dpt. Streets, City H... plans 50% completed brick, asphalt ... surfacing 2,700 ft. Main St., S.B.I. 1, Gr... to Chestnut Sts. $32,000; plans asphalt ... existing brick resurfacing 5,250 ft. Cas... St., Arterial 6, Washington to Stewart ... $35,000; 4,750 ft. Washington St., Arte... 1, McClure to Mercer Sts., $38,000. S. W... hoit, city engr.

Ill., East Peoria—City, plans comple... 32 ft. concrete pavement starting at ... block Pekin St., from Highland, Gr... View and north on Randolph to Fe... Sts., $30,000; 56 ft. concrete paving M... St. to Cedar St. Bridge on West Washi... ton St. $100,000. E. Fitzgerald, 327 P... St., Pekin, city engr.

Ill., Harrisburg—City, City Hall, pl... raising 3 streets in low ground; plans co... pleted resurfacing brick streets 25 ye... old. $120,000. R. D. Brown, supt. Hys., H... risburg, engr.

★**Ill., Peoria**—City, concrete paving G... St. $66,750***plans completed conc... paving Malone St. $55,425; Western ... $182,024; South Adams St. $64,045; Elm... St. $32,500, all foregoing 1st year of 5 ye... plan***Marguetta St. $26,180; Spring ... $70,000; Nebraska St. $37,400; pla... 50% completed Prospect St. $107,... plans 7 St. $70,000; North St. $130,000, ... foregoing 2nd year of 5 year plan***pla... 50% completed repairing paved channel ... Run Creek, $87,000; plans concrete pavi... Main St. $478,700, both 3rd year of 5 ye... plan***paving alleys $106,000; Bouriand St...

WAR PROJECTS (Cont'd.)

...; Main St. $124,400, all foregoing 4th ... of 5 year plan***plans completed con... paving McClure St. $389,000; plans pav... $212,000, both after 5 years of 5 ... ***Glen Oak St. $49,000; Franklin ...,000; Knoxville St. $315,178, all fore... 5th year of 5 year plan. L. D. Jef... city engr.

...Kalamazoo—City, paving city streets. ... M. Lee, city engr.

...Lafayette—City, H. B. Overesch, engr., City Hall, paving, imprv. streets, ... or more.

...New Castle—City, S. Baker, mayor, ... Hall, making grade reductions on ... $125,000. City Engineering staff, ...

...New Castle—City, curbing, gutter... ,000 lin. ft. streets. $80,000.

...South Bend—City, plans 50% com... turning over bricks on 50,000 sq. yd. ...ment. $150,000; plans opening and pav... Western Ave. from Michigan to Green... Sts. $65,000; resealing asphalt streets, ... C. E. Williams, city engr.

...Detroit—Wayne County Rd. Comm., 2800 Barium Tower, Detroit, and ...igan State Hy. Dpt., Lansing, preliminary plans completed rotary type crossover ...nnect 2-level crossing of proposed John ...dge Expressway and Crosstown Motor... $1,000,000. L. C. Smith, Detroit, co. ... C. M. Zeigler, Lansing, hy. engr.

...Red Lake Falls—City, paving Main ... $3,000.

...Brentwood—City, plans completed ...rete paving. $105,000. Legal rights not ...ed and financing not yet provided for. ... Heagler, city engr.

...New Hampshire—State Hy. Dpt., Concord, bituminous macadam paving 10 ... Bethlehem-Carroll Hy. $600,000.

...Y., New Hampton—Dpt. P. Wks., Municipal Bldg., New York, Zone 7, plans under... Proj. CS-3, constructing roads, incl. ...scaping and drainage at New York City ...rmatory, for Dpt. Correction, 100 Centre ... New York. $150,000. State Aid Planning ...ds allotted. C. Clark, 101 Park Ave., ... York, Zone 17, consult. engr.

...Y., New York—Dpt. P. Wks., Municipal ..., Zone 7, plans underway Proj. CS-1, ...structing roads, incl. landscaping cer... areas on Rikers Island, for Dpt. Cor...tion, 100 Centre St. $200,000. State Aid ...ning Funds allotted. I. V. A. Huit, comr. ... Wks.

...Y., New York—President Bronx Boro, ... Grand Concourse, New York, plans under ... granite block repaving E. 161st St. ...ue to Summit Aves. (PXS 137), $7,163; ...t asphalt paving E. 145th St., 3 to Col... Aves. (PXS-139), $8,688; E. 148 St., ...rtland to 3 Aves. (PXS-56), $5,002; E. ... St. Morris to Courtland Aves. (PXS-58), ...963; E. 153 St., Elton to Melrose Aves. ...S-60), $7,830; brick repaving E. 150 St. ...rtland to Melrose Aves. (PXS-57), $13,589; ...aving Andrews Ave., Burnside Ave. to W. ... St. (PXS-141), $11,508; E. 168 St., 3 to ...rtland Aves. (PXS-145), $20,761; Ville... Bedford Park Blvd. to Van Courtland ... (PXS-132), $30,200; E. 142 St. Rider ... Brook Aves. (PXS-135), $50,840; E. 179 ... Jerome Ave. to Grand Concourse (PXS-... $34,300; Fulton Ave. E. 172 to E. 175 Sts. (PXS-133), $23,520; Franklin Ave. E. 168 to ... Sts. (PXS-134), $23,520; Trinity Ave., E. ... to E. 163 Sts. (PXS-136), $10,780; asphalt ...k repaving Baretto St., Southern Blvd. ... Whitlock Ave. (PXS-53), $6,870; Park ..., E. 165 St. to Claremont Pkwy. (PXS-... $133,490. State Aid Planning Funds al... ...d. T. B. Dyer, ch. engr.

...N. Y., New York—President Bronx Boro, ...61 Grand Concourse, plans underway ...ding W. 250 St. Post Rd. to Tibbett ... (PXS) $12,100; Bronx River Ave. E. ... St. to E. Tremont Ave. (PXS-85) $37,... ...; Sedgwick Ave. Van Cortland Ave. to ...dale Pkwy. (PXS-82) $32,500; W. 233 ... Arlington to Netherlands Aves. (PXS-... $8,500; Sigma Pl. (PXS-81) $24,600; E. ... St., Laconia Ave. to Grenada Pl. (PXS-79) $6,900; Tieman Ave., Boston ... to E. 233 St. (PXS-80) $11,000; Morris ...t Ave., E. 177 St. to E. Tremont Ave. (PXS-... $10,000; E. 215 St., Paulding to Lacona ... (PXS-77) $12,000; sheet asphalt pav... Paine St. Bradford to Crosby Aves. (PXS-179) $28,000; Maran Pl. Bronx Park ...st to Crager Ave. $16,000; E. 169 St. ...nklin Ave. to Boston Rd. (PXS-151) ...,300; E. 169 St., Park to 3 Aves. (PXS-... $12,730; Creston Ave., E. Tremont ...e. to E. 179 St. (PXS-159) $10,300; Cres... Ave., E. 179 St. to Burnside Ave. (PXS-... $14,800; City Island Ave. (PXS-73) ...,250; Spuyten Duyvil Parkway, Hendrik ...dson Pkwy. to Bway. (PXS-74) $138,000; ...135 St. Southern Blvd. to Locust Ave. (PXS-74) $35,500; Woodycrest Ave., W. 165 ... to Shakespeare Ave. (PXS-158) $43,500; E. ... St. Marion to Jerome Aves. (PXS-160) ...,300; E. 169 St. Grant to Teller Aves. (PXS-150) $23,100; Bway, W. 230 St. to ... 242 Sts. (PXS-148) $15,406; E. 158 St., ...rtland to Melrose Aves. (PXS-61) $5,325; ... 158 St., Eagle to Jackson Aves. (PXS-... $12,720; E. 149 St. Jackson to Caldwell ...es. (PXS-63) $8,234; Faile St., Lafayette ... Seneca Aves. (PXS-59) $14,397; repaving ...estchester Ave., E. Tremont Ave. to Lee

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POSTWAR PROJECTS (Cont'd.)

St. (PXS-143) $302,870; Westchester Ave., Lee St. to Morris Park Ave. (PXS-1 $212,165; Westchester Ave., Morris Pk Ave. to Eastern Blvd. (PXS-145) $174,0 Willis Ave., E. 133 St. to E. 141 St. (PX 146) $190,264; Willis Ave., E. 141 St. to Ave. (PXS-147) $167,706; Morris Ave., 149 St. to Park Ave. (PXS-64) $113,0 Webster Ave., 165 to 168 Sts. (PXS-65) $1 447; Grand Concourse, E. 161 to 206 (PXS-67) $1,046,448; widening 3 ft. on e side 3 Ave. from E. 139 to E. 144 (PXS-68) $90,180; setting curbing, lay sidewalks Spencer Lane; Griswold Ave. Lucerne St. (PXS-169) $9,400; concrete paving E. 161st St. (PXS-70) $13,720; br paving Albany Crescent, Bailey Ave., Kingsbridge Terrace (PXS-163) $30,0 dressed granite block repaving Garri Ave., Hunts Pt Rd. to Whittier St. (PX 69) $64,008; St. Paul's Pl., 3 to Park Av (PXS-153) $30,267; White Plains Rd. S ton Rd. to Burke Ave (PXS-154) $200,0 brick repaving Bedford Park Blvd. (PX 73) $114,400. State Aid Planning Fu allotted. T. B. Dyer, chief engr.

N. C., Thomasville—City, street pav program. $165,000. R. M. Cooksey, c mgr.

O., Fostoria—City, H. M. Wanzer, serv dir., City Hall, widening Main St. $40,0

★**O., Lorain**—City, H. G. Van Wagen mayor, City Hall, paving and imprv. streets. $500,000. Financing not yet pr vided for. L. Goodell, City Hall, city en CD 12/27/43—ENR 1/13/44.

★**Okla., Oklahoma City**—City, plans u derway, highway imprvs. $900,0 Financing not yet provided for. Har Bartholomew & Associates, 317 N. 11 St. Louis, Mo., consult. engrs. R. Lee, c engr.

Wash., Aberdeen—City, plans 25% co pleted, plant and road mix asphaltic su facing. $366,266. N. J. Salmon, c/o own consult. engr.

Wash., Wenatchee—City, curbs, walks, l tuminous surface treating roads. $50,0 J. Dustan, city engr.

EARTHWORK, WATERWAYS

Mo., Brentwood—City, plans 90% co pleted widening, straightening, chann channel of Black Creek. $65,000. La rights not cleared and financing not y provided for. J. B. Heagler, city en

N. Y., College Point (Sta. Flushing)—D Marine & Aviation, J. McKenzie, comr., F A, North River, New York, plans underwa bulkhead wall, foot of 14 Ave. (DS-1 $150,000. State Aid Planning. Funds allo ted. A. J. Duggan, Sr., civil engr.

★**Tex., Anahuac**—Chambers & Liber Counties, G. G. Jackson, judge, 441,0 acre navigation dist., fresh water lake Trinity Bay for flood waters, terminal rail way 8.5 mi. dike across Trinity Ba $35,000,000. Garrett Eng. Co., 1806 Mila St., Houston, engr. CD 7/30.

Wash., Aberdeen—City, City Hall, pla

★40% completed earth dll, levee and co crete sea-wall. $765,000. N. J. Salmo Aberdeen, consult. engr.

PUBLIC BUILDINGS

Ill., Springfield—City Water & Light Co City Hall, plans underway imprvs. substa tion transmission and distr. sys., Lake Sh Plant, 5 mi. southeast of here, $150,0 Burns & McDonnell Eng. Co., 107 Linwo Blvd., Kansas City, Mo., consult. engr.

★**Ill., Springfield**—City Water & Light Co City Hall, plans underway 25,000 kw power plant addn., $3,126,000; 25,000 kw power plant addn., $1,055,000. Burns & Mc Donnell Eng. Co., 107 Linwood Blvd., Kansas City, Mo., consult. engr. CD 1/13—ENR 2/10.

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WAR PROJECTS (Cont'd.)

, New Castle—City plans city hall and fire station. $150,000.

, South Bend—City, plans Street Department garage, and repair bldg., railway from Michigan Central R.R. $60,000. Williams, city engr.

, Baltimore — City Hall, plans by R. Edmunds, Jr., 409 Calvert Bldg., health and peoples court bldg. com- Bond issue to be voted in ber. CD 1/27—ENR 2/10.

, Ann Arbor — University of Michplans underway by Harley & Elmas, 1507 Stroh Bldg., Detroit, general rris bldg. $1,000,000; plans underway by C. Kingscott & Associates, Kalamazoo, mistry Bldg. adds. $700,000; plans unway by Giffels & Vallet, engrs. and its, 1000 Marquette Bldg., Detroit, Enering Bldg. addn. $1,400,000; plans way by Black & Black, Lansing, Busi- Administration Bldg. $900,000; plans by forces, heating plant, $400,000. CD 5/10 NR 5/18.

, Detroit—Dpt. P. Welfare, 176 E. Jefferson Ave., plans completed Receiving spital addn. $328,000. G. R. Thompson, y Hall, engr. CD 6/7—ENR 6/15.

, Detroit—Detroit Housing Comm. 409 Griswold St., plans completed by ler, Ellington & Day, 1507 Stroh Bldg., mit, Douglass Housing, incl. 54 bldgs. dwelling units). $4,650,000. G. R. mpson, City Hall, city engr.

, Ecorse—Wayne Co., Detroit, plans completed Eloise Hospital, brick, steel, n-con., stone $2,000,000. L. C. Smith, Barium Tower, Detroit, co. engr.

, Ashtabula—Bd. Educ., A. W. Lewis, clk., 44 St., plans by C. V. Martin, 232 ter St., and H. A. Fulton, assoc. archt., 14 Euclid Ave., Cleveland, grade and jun- high school, athletic field, $750,000. nancing not yet provided for. CD 12/1— NR 12/9.

, Elyria—Comrs. Lorain Co., plans $1,000,000 bond election in November court house.

, Fostoria—City, H. M. Wanzer, service combination city hall and auditorium, 0,000.

, Kent—Kent State University, G. Bowman, pres., plans by State Architects, lumbus, men's dormitory bldg., $1,282,000.

, Lima—Bd. Educ., R. Wiseley, pres., Citizens Bldg., plans by Thos. D. McLaughlin, Dominion Bldg., 1, and 3 story, mmt., 180x200 ft., brick, steel high school ddn. $250,000; plans 25% completed by hos. D. McLaughlin, Dominion Bldg., brick, el, concrete vocational educational bldg. 0,000, bond issue to be voted on in November election. Financing not yet provided r.

, Lewis—City, H. G. Van Wagnen, ayor, City Hall, police and fire station. 0,000. Financing not yet provided for. Goodall, city hall, city engr.

Tex., Austin—City, T. Miller, mayor, plans completed by Adams & Adams, Bldrs. ch. Bldg., San Antonio, 2 story police nd courts bldg. $200,000. CD 5/15—ENR /1.

Ont., Peterboro—City, Ald. H. I. Bradburn, chn., health and athletic centre, incl. ketball and runby fields, swimming pool, rtificial ice arena. $330,000. J. E. Jepson, aterboro, pres.

Que., Westmount—City, plans by Shorey Ritchie, 2046 Union Ave., Montreal, police nd fire station, 21 Stanton St. $250,000. D 5/18—ENR 6/1.

Que., Three Rivers—Protestant School rustees, c/o C. G. Mills, 737 Ste. Genevieve t., plans by architect, c/o A. A. Sharpe, O. Box 551, high school. $150,000. Site urchased.

COMMERCIAL-BUILDINGS

A, Conn., Glastonbury—C. Monzeglio, 1336 Main St., plans underway residential development on 150 acres. $2,000,000.

Conn., New Haven—Hariaco Co., 164 Linen St., brick, steel apartment. $150,000.

A, Conn., Trumbull—John Henry Snyder, Long Hill, plans underway 350 frame or rame and brick residences on 92 acres, Nelsey Sterling Farm. Over $1,000,000.

Ill., Abingdon—S. E. Pirtle, Orpheum heatre, Jerseyville, theatre. Est. $150,000.

Ill., Bushnell—S. E. Pirtle, Orpheum heatre, Jerseyville, theatre. Est. $150,000.

Ill., McLeansboro—S. E. Pirtle, Orpheum heatre, Jerseyville, theatre. Est. $150,000.

Md., Baltimore — Gregory Memorial Baptist Church, 5701 York Rd., sketches by R. Edmunds, Jr., 409 Calvert Bldg., 1 tory, bsmt., stone church bldg. $250,000.

Mass., Haverhill — Pentucket Savings ank, 42 Washington Sq., plans by Hutchins French, 11 Beacon St., Boston, bank bldg., Washington Sq. $200,000.

N. J., Hoboken—St. Mary's Hospital, Willow Ave., plans by C. F. Dieffenbach, 84 Washington St., Hoboken, maternity wing ospital. $156,000.

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(Cross Section)

POSTWAR PROJECTS (Cont'd.)

N. Y., Flushing—Bertrose Realty Co., G. Tilles, pres., c/o P. R. Silverstein, 161 St., Jamaica, apartment houses blocks bounded by 149 and 147 Sts., North Blvd. and Roosevelt Ave. Over $150,000.

N. Y., New York—Roman Catholic Archdiocese of New York, 477 Madison Ave., Zone 12, plans underway by Eggers & Higgins, 542 5 Ave., Zone 19, 57x100 ft. Our Lady of Victory Chapel, Pine and Williams Sts. To exceed $150,000. CD 3/27—ENR 4/5.

N. Y., New York—L. Brecher, 595 Madison Ave., Zone 22, plans completed by Schlanger, 595 Madison Ave., Zone 22, 3 story office, stores, studio and motion picture theatre, 53 St. and 6 Ave. $450,000.

N. C., Charlotte—Memorial Hospital, 140 Scott Ave., plans 50% completed by W. T. Hook, Commercial Bank Bldg., 6 story hospital addn. $300,000. CD 3/2—ENR 3/13.

O., Fremont—St. Joseph's Church, Msgr. J. S. Arnold, elementary and high school bldg. $250,000. Financing not yet provided for.

O., Newark—St. Francis de Sales Parish, Newark, high school and social center, rectory, $250,000.

★**Okla., Bartlesville**—Phillips Petroleum Co., A. H. Riney, vice pres., Bartlesville, plans 25% completed by Neville & Sharp, 1221 Baltimore St., Kansas City, Mo., 9 story office bldg., incl. gymnasium, auditorium, cafeteria, etc. $3,000,000. Land secured. (Correction—architect.) CD 6/22—ENR 7/11.

★**Pa., Phila**—H. A. Robinson, Morris Bldg., 1421 Chestnut St., 1,794 residences on 200 acres at Ogontz Ave. and Limekiln Pike. $17,940,000. Construction contract, to A. P. Orleans, 100 West Rockland St., Phila.

Tex., Dallas—Trinity Presbyterian Church, 104 E. 10 St., plans 5% completed by G. Gill, Great National Life Bldg., church bldg. $150,000.

Tex., San Antonio—National Hotel Co., Anico Bldg., plans by A. S. Fraser, 62 Amer. Natl. Ins. Bldg., Galveston, 11 story rein-con., brick, stone, steel hotel. $400,000. CD 2/13—ENR 3/9.

★**Wash., Spokane**—First National Bank, 704 Riverside Ave., 5 or 6 story bank bldg. $500,000.

Alta., Lethbridge—Famous Players Canadians Corp., Royal Bank Bldg., Toronto, Ont., purchased site theatre on Fourth Ave. $150,000.

Que., St. Louis (P. O. Bienville)—Sisters of Charity of St. Louis De Bienville, normal school. $200,000.

INDUSTRIAL BUILDINGS

Calif., San Francisco—PLANT—The Western Crown Cork & Seal Co., subsidiary of The Crown Cork & Seal Co., Eastern Ave. and Kresson St., Baltimore, Md., C. E. McManus, pres., bottle and closure mfg. plant, on 33 acre site.

Conn., Glastonbury—PLANT—C. Monsello, 1336 Main St., plans cold storage plant, $45,000.

Md., Baltimore—PLANT—National Gypsum Co., 100 Delaware Ave., Buffalo, N. Y., plans gypsum processing plant.

Mass., Roxbury—FACTORY—Boylston Investment Co., 12 Harvard St., Boston, altering brick factory, Simmons and Hampshire Sts. $125,000.

Minn., Red Wing—PLANT—Red Wing Malting Co., E. O. Gruenzel, mgr., tentative plans 6 story 80x160 ft. plant addn. $100,000.

N. Y., Jamestown—SERVICE STATION—Colonial Beacon Oil Co., 275 Stuart St., Boston, Mass., and 226 Steel St., Jamestown, N. Y., site acquired modern super service station, S. Main St. Over $40,000.

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...WAR PROJECTS (Cont'd.)

...N. Y., New York—FACTORY, etc.—S. ...ers, 10 South St., New York, plans by ...ers. 10 South St., New York, plans by ...H. Burmeister. 155-31 Jamaica Ave., ...ica. 2 story factory, office, storage and ...house. $60,000.

...C., Belmont—HOSIERY MILL—Bel... Hosiery Mills, Belmont, plans com... by H. V. Biberstien, consult. engr. and ...t. 1600 Elisabeth Ave., Charlotte, 2 story, ...56 ft. hosiery mill, steel, wood. $120,000.

...Ont., Sudbury—PLANT—Canada Packers, ... 13 W. Elm St., Sudbury, packing and ...ings plant. $100,000.

UNCLASSIFIED

...la., Montgomery—RADIO STATION—G. ... Covington, Jr., WCBV, Exchange Hotel, ... radio station. Over $25,000.

...la., Montgomery — RADIO STATION — ...tgomery Broadcasting Co., Inc., Jefferson Davis Hotel, FM radio station. Over ...,000.

...rk., Conway—DIESEL ENGINE, etc.—...way Corp., F. Gordy, bus. mgr., Conway, ...s. new diesel engine, larger switchboard, ...w lines in all parts of city. $100,000.

...Calif., Fresno—RADIO STATION—J. E. ...man, KFRE, T. W. Patterson Bldg., ... radio station. Over $25,000.

...Calif., Hollywood — RADIO STATION — ...umbia Broadcasting System, Inc., 6121 ...set Blvd., FM radio station. Over ...,000.

...Calif., Los Angeles—RADIO STATION—...rb C. Anthony, Inc., KECA, 141 N. Ver... Ave., FM radio station. Over $25,000.

...Calif., Los Angeles—RADIO STATION—...tional Broadcasting Co., Sunset and Vine ..., FM radio station. Over $25,000.

...Calif., Los Angeles—RADIO STATION—...ndard Broadcasting Co., KFVD, 338 S. ...stern Ave., FM radio station. Over ...,000.

...Calif., Oakland—RADIO STATION—Tri... Bldg. Co., KLX, Tribune Tower, FM ...dio station. Over $25,000.

...Calif., Riverside — RADIO STATION — ...oadcasting Corp. of America, KPRO, 3401 ...ssell St., FM radio station. Over $25,000.

...Calif., Stockton—RADIO STATION—E. F. ...ffer, KGDM, 49 South California St., Stock... FM radio station. Over $25,000.

...Colo., Denver — RADIO STATION — KLZ ...oadcasting Co., Shirley Savoy Hotel, FM ...dio station. $25,000.

...Fla., Fort Pierce — SHIPYARD — Fort ...erce Financing & Construction Co., Fort ...erce, plans shipyard, ways. $6,000,000. ...M. Haynes, West Palm Beach, engr.

...Ill., Bloomington—ELECTRIC LIGHT & ...POWER DISTRIBUTION SYSTEM—City ...ater & Light Dpt., City Hall, exten. elec... light and power distr. sys. Over ...,000. S. Wilhoit, city engr.

...Ill., Bloomington—PARK IMPROVE...ENTS—City, City Hall, park imprvs., in ...ller and O'Neil's Parks, and Fell Ave. ...ygrounds, $100,000. S. Wilhoit, city engr.

...Ill., Chicago—RADIO STATION—Drovers ...rnal Publishing Co., WAAF, U. S. Yards, ...icago, FM radio station. Over $25,000.

...Ill., Galesburg—TENNIS COURTS, etc.—...ty Park Bd., City Hall, tentative plans for ...tennis courts to be used as skating rinks ...winter, croquet courts (hardsurfaced) in 5 ...rks, black top roads through 5 parks, 2 ...elter houses and altering children's wad... pool.

...Ill., Peoria—AIRPORT, etc.—Peoria ...Pleasure Drive Way & Park Dpt., Glen ...k Park, Peoria, plans completed, airport ...mpletion incl. exten. present concrete run...ys, widening 2 present runways and ...talling lights, administration and hangar ...dg., $300,000, sketches administration bldg. ...d hangar for airport, $100,000, Austin Eng. ..., 115 S. Jefferson St., Peoria, consult. ...ers.; plans 2 small or 1 large swimming ...ol, $250,000; palm house at Glen Oak ...rk, $50,000.

...Ill., Quincy—HANGAR—City, hangar and ...dministration bldg., at airport, 2 mi. east ...f here. $125,000. J. O. Potter, city engr.

...Ill., Quincy—PARK IMPROVEMENTS—...ty, R. Bangert, chn. Park & Blvd. Bd., ...9 State St., plans completed filter plant ...d pump house for existing swimming pool ...Quincy; plans 18 hole golf course prob... on eastern outskirts of Quincy; horse... tennis courts; shelter houses in In... Mound, Riverview and Primrose Parks. ...r $60,000.

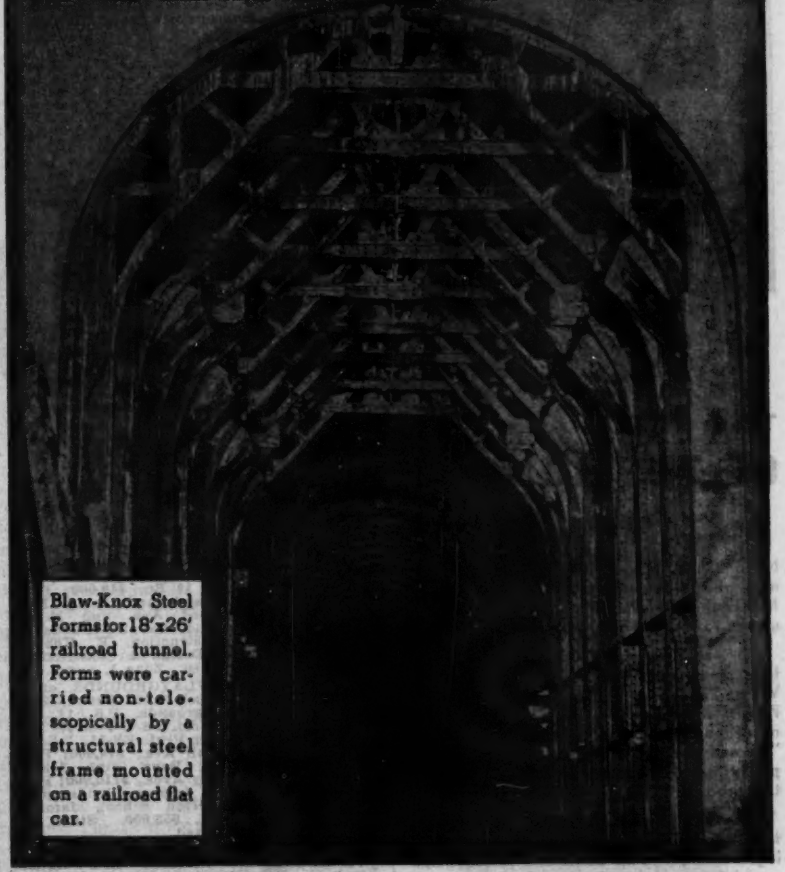
...Ill., Rockford—RADIO STATION—Rock... ...d Broadcasters, Inc., WROK, 109 S. Water ..., FM radio station. Over $25,000.

...Ind., Decatur—SWIMMING POOL—City, ...imming pool, $75,000, incl. equip. Financ... not yet provided for. R. E. Wolf, city ...gr.

...Ind., Indianapolis — AIRPORT — Missouri ...stitute of Aeronautics, East St. Louis, ..., plans underway airport with school, ...ct to be landscaped. $260,000. Financing ...ot yet provided for.

...Ind., Kokomo—GRANDSTAND—City, con...rete grandstand, Phillips Park. $75,000. ...L. Lee, city engr.

BLAW-KNOX STEEL FORMS



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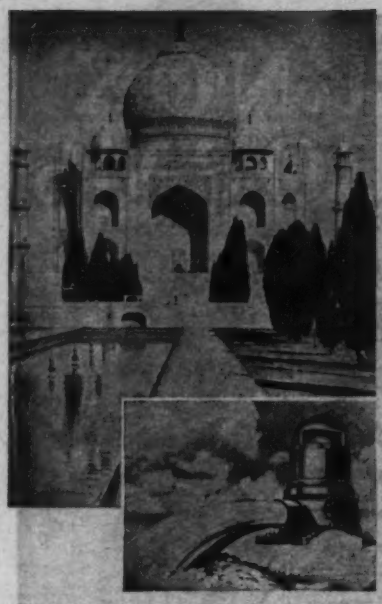

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POSTWAR PROJECTS (Cont'd.)

Ky., Lexington—RADIO STATION—American Broadcasting Corp. of Kentucky, Radio Bldg., FM radio station. Over $25,000.

Me., Portland—RADIO STATION—Portland Broadcasting Sys., Inc., WGAN, 545 A Congress St., FM radio Station. Over $25,000.

★**Md., Baltimore**—PIER—City plans pier in Canton Sect. Harbor. $1,000,000.

★**Mich., Detroit**—AIRPORT—Dpt. P. Wks., City Hall, plans underway runways, aprons, concrete parking areas, grading, drainage, bldgs., for Class 4 Airport. $6,647,000. G. R. Thompson, city engr. CD 11/3/40—ENR 11/14/40.

★**Mich., Detroit**—LIGHTING SYSTEM, etc.—Public Lighting Comn., 174 Atwater St., plans 2,000 ft. feeder# of sys. to loop, $750,000; plans completed electrical generator and distr. sys. $90,250, G. R. Thompson, City Hall, city engr. CD 8/7—ENR 8/15.

★**Mich., Detroit** — RECREATIONAL BEACH—Huron-Clinton Metropolitan Authority, 2456 Penobscot Bldg., plans 10 mi. recreational beach, on 6 acres filled land, west shore of Lake St. Clair, between Gaulker Point and Point Huron. $6,000,000. H. S. Curtis, Ann Arbor, engr.

Minn., Baudette—AIRPORT—Village, M. Firmenich, clk., municipal airport. Over $25,000.

Minn., Thief River Falls—AIRPORT—City, W. J. Donville, clk., City Hall, municipal airport. $50,000.

Minn., Springfield—AIRPORT—City, A. Niemann, clk., municipal airport. $25,000.

New York—HANDBALL COURT, etc.—Bd. Higher Educ., 535 Park Ave., New York, Zone 21, Proj. HNS 4, handball and tennis courts, baseball and football fields, Queens College, Queens Co. $125,000. State Aid Planning Funds allotted.

N. Y., Brooklyn—PIERS—Dpt. Marine & Aviation, J. McKenzie, comr., Pier A, North River, New York, plans underway reconstructing pier and shed foot 31st St., (DS-24) $140,000; pier and shed foot 33 St., (DS-25) $75,000; repairing pier and shed foot 35 St. (DS-26) $100,000. State Aid Planning Funds allotted. A. J. Duggan, Sr., civil engr.

N. Y., Brooklyn—PLAYGROUND, etc.—Bd. Educ., 49 Flatbush Ave. Exten., Zone 1, plans underway Proj. ES-3, playground, P.S. 254, Ave. Y and E. 19 St., $40,000; Proj. ES-9, athletic field and landscaping, Midwood H. S., Bedford Ave. and E. 16 St. $90,000. State Aid Planning Funds allotted. Bureau Construction, E. Kebbon, supt. School Bldgs., Design & Construction, 49 Flatbush Ave. Exten., Zone 1, engr.

N. Y., Brooklyn—PLAYGROUNDS, etc.—Bd. Educ., 49 Flatbush Ave. Exten., Zone 1, Proj. ES-2, playgrounds, P.S. 18, 191 Maujer St., $25,500; Proj. ES-4, P.S. 25, 1061 Herkimer St., $20,000; Proj. ES-11, P.S. 97, Avenue S and Stillwell Ave., $14,000; Proj. ES-12, athletic field, Boys' High School, Maple and Schenectady Aves., $110,000; Proj. ES-13, athletic field imprvs., landscaping, Franklin K. Lane High School, Jamaica Ave. and Dexter St., $55,000. State Aid Planning Funds allotted.

N. Y., Elmhurst—ATHLETIC FIELD, etc.—Bd. Educ., 49 Flatbush Ave. Exten., Brooklyn, Zone 1, Proj. ES-16, Newtown H. S. athletic field and grandstand, 56 Ave. and 90 St. $150,000. State Aid Planning Funds allotted.

N. Y., Flushing—ATHLETIC FIELD, etc.—Bd. Educ., 49 Flatbush Ave. Exten., Brooklyn, Zone 1, plans underway, Proj. ES-7, athletic field and field house, Leavitts Athletic Field, 32 Ave. and 127 St. $145,000. State Aid Planning Funds allotted. Bureau Construction, E. Kebbon, supt. School Bldgs., Design & Construction, 49 Flatbush Ave. Exten., Brooklyn, Zone 1, engr.

N. Y., Flushing—ATHLETIC FIELD, etc.—Bd. Educ., 49 Flatbush Ave. Exten., Brooklyn, Zone 1, Project ES-17, Curtis High School athletic field, field house, grandstand, alterations, Richmond Co. $175,000. State Aid Planning Funds allotted.

N. Y., Jackson Heights—TAXI STRIPS, etc.—Dpt. Marine & Aviation, J. McKenzie, comr. Pier A, North River, New York, plans underway addn. taxiway strips, Municipal Airport 2, LaGuardia Airport. $75,000. State Aid Planning Funds allotted. A. J. Duggan, Sr., civil engr.

N. Y., Jamaica — GRANDSTAND — Bd. Educ., 49 Flatbush Ave. Exten., Brooklyn, Zone 1, Project ES-14, grandstand Jamaica High School athletic field, 168 St. and 84 Ave. $90,000. State Aid Planning Funds allotted.

N. Y., Long Island City—ATHLETIC FIELD—Bd. Educ., 49 Flatbush Ave. Exten., Brooklyn, Zone 1, Project ES-15, athletic field Long Island City High School, 41 Ave. and 29 St. $80,000. State Aid Planning Funds allotted.

N. Y., New Dorp—ATHLETIC FIELD—Bd. Educ., 49 Flatbush Ave. Exten., Brooklyn, Zone 1, plans underway Proj. ES-5, New Dorp High School athletic field, Clawson St. $195,000. State Aid Planning Funds allotted. Bureau Construction, E. Kebbon, supt. School Bldgs., Design & Construction, 49 Flatbush Ave. Exten., Brooklyn, Zone 1, engr. CD 1/14—ENR 1/27.

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TWAR PROJECTS (Cont'd.)

Y., New York—LANDSCAPING, etc.—Higher Educ., 695 Park Ave., Zone 21, HNS-26, landscaping, incl. ornamental ...ees for uptown campus, at City ...ege. $50,000. State Aid Planning Funds ...ted.

N. Y., New York—PIERS—Dpt. Marine & Aviation, Pier A, North River, J. McKenzie, ...r., plans underway reconstructing Pier ...S-7) $100,000, repairing, replacing West ...St. Pier (DS-13) $150,000, Pier 76 (DS-...) $155,000. CD 1/21—ENR 3/10; boat basin ... 155 to West 158 Sts. (DS-6) $100,000; ...head wall, West 132 to 135 Sts. (DS-1) ...000, all foregoing on North River*** ...rminal waiting room, Whitehall St. ...y Terminal (DS-10) $50,000; reconstruct- ...Pier 31, (DS-15) $110,000; reconstructing ...12 and new shed (DS-5) $150,000; re- ...ucting Pier 67 (DS-7) $100,000; recon- ...cting Pier 4 (DS-12) $92,000 all foregoing ...East River***reconstructing piers at ...ewort Market (DS-17) $140,000***re- ...ing and concreting docks between slips ...Whitehall and South Ferry Terminals ...-19) $150,000. State Aid Planning Funds ...ted. A. J. Duggan, Sr., civil engr.

N. Y., New York—PLAYGROUNDS, etc.—...Educ., 49 Flatbush Ave. Exten., Brook- ...Zone 1. Proj. ES-9, playground and ...s recav., P.S. 30, 141 St. and Brook ...$74,458. Proj. ES-10, alterations, land- ...ing at athletic field, James Monroe High ...ol, 1218 Boynton Ave. $22,000; plans ...erway Proj. ES-1, playground, P.S. 114, ...Cromwell Ave. $105,000, Proj. ES-2, ...yground, W. H. Taft High School, 240 E. ...St. $80,000, E. Kebbon, supt. School ...gs, Design & Construction, Bureau Con- ...uction, engr. State Aid Planning Funds ...ted.

N. Y., New York—SUB-SURFACE STRUC-TURES—Dpt. P. Wks., Municipal Bldg., New ...k, Zone 7, plans underway, Proj. CS-4, ...-surface structures (tunnels for utilities) ...Rikers Island, for Dpt. Correction, 100 ...tre St. $60,000. State Aid Planning ...ds allotted. I. V. A. Hule, comr. P. ...s.

N. Y., New York—TUNNEL, etc.—Bd. ...her Educ., 695 Park Ave., Zone 21, Proj. ...S-7, new tunnel above existing tunnel be- ...en Davis and Gillet Halls, $46,000; Proj. ...S-8, waterproofing tunnel walls, $30,000; ...l. HNS-5, reconstructing bluestone walks, ...00; Proj. HNS-24, new stadium, $86,000, ...at Hunter College, Bronx Bldg., Bedford ...k Blvd. and Navy Ave. State Aid Plan- ...g Funds allotted.

N. Y., St. George—DOCKS, etc.—Dpt. ...Marine & Aviation, J. McKenzie comr., ...er A, North River, New York, plans un- ...erway rebuilding and concreting docks ...tween slips. (DS-20) $150,000; waiting ...m, comfort station, widening bus plat- ...m, (DS-8) $160,000; modernizing waiting ...m (DS-9) $100,000 all foregoing at St. ...rge Ferry Terminal; exten. fire dock, ...uilding old section, concreting deck (DS- ...) $100,000; carpenter shop (DS-5); $50,000. ...te Aid Planning Funds allotted. A. J. ...ggan, Sr., civil engr.

N. Y., Stapleton—PIERS—Dpt. Marine & Aviation, J. McKenzie, comr., Pier A, ...rth River, New York, plans underway re- ...nstructing Pier 6 (DS-21) $87,000; Piers 9 ...d 10 to accommodate railroad tracks (DS- ...) $100,000; repairing pier and shed (DS-27) ...,000; Pier 8 (DS-28) $100,000; Pier 9 ...S-29) $100,000; Pier 10 (DS-30) $100,000; ...er 18 (DS-31) $100,000. State Aid Planning ...nds allotted. A. J. Duggan, Sr., civil engr.

N. C., Gastonia—ELECTRIC SYSTEM—...y, H. Rutter, mgr., plans underway elec- ...c system. $77,000. W. C. Platt, box 971, ...ham, consult. engr.

N. C., Thomasville—PARKS—City, R. M. ...okney, mgr., parks, swimming pool, recrea- ...n bldg. $100,000.

O., Lorain—AIRPORT—Comrs. Lorain Co. ...ans $600,000, bond election in November ...r 1st section airport. Total cost $1,500,000.

Pa., Phila.—BALL PARK—Shibe Ball ...Park, 20 and Lehigh Aves., plans ramps, ...00 seats, offices, restaurant. $1,000,000.

Pa., Phila.—ROLLER SKATING RINK—...w Dreamland Corp., 925 Prellaghuysen ...e., Newark, N. J., roller skating rink, ...Terrell St., Kensington. Hunting Park and ...rresdale Aves. $350,000.

R. I., Providence — ROLLER SKATING ...INK—R. E. Bernier, Portsmouth, plans by ...T. Russillo, 37 Rowan St., 1 story, 100x ...0 ft. reinf.-con. roller skating rink. To ...ost $75,000. Site not selected.

Wash., Wenatchee—AIRPORT BLDG., etc. ...City, plans underway by L. Solberg, ...enatchee, administration bldg. and other ...rk at municipal airport J. Dunstan, city ...gr.

Wis., LaCrosse—AIRPORT BLDGS., etc. ...City, F. Kramer, clk., airport administra- ...on and hangar bldgs., $100,000; park im- ...vts., $60,000. J. H. Barth, city engr.

Ont., Burlington — SPORTS CENTER — ...S. Nicholson, Burlington, sports com- ...unity centre, $60,000. H. E. Murton, 15 ...mes St., Hamilton, archt.

Ont., Sudbury—AIRPORT, etc.—Liteplane ...r Service Co., Ltd., c/o W. A. Wilson, 23 ...ve St., airport and essential bldgs. ...,000.

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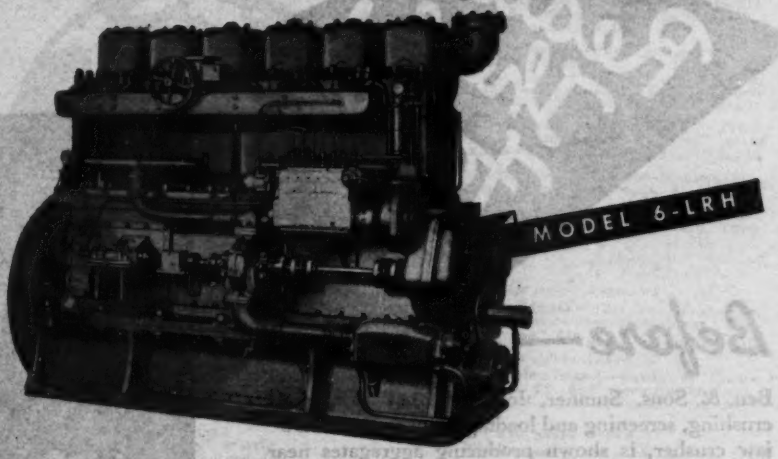

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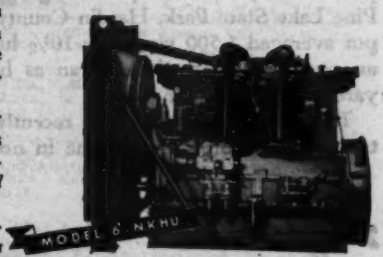

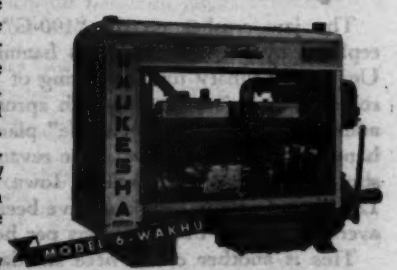

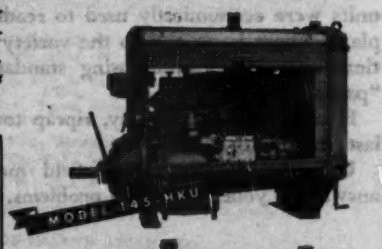

Engine Model	No. of Cyls.	Bore and Stroke, In.	Displ. Cu. In.	Speed RPM
*130-HS	4	3¾ x 5	221	1000-1800
*130-HL	4	4 x 5	251	1000-1800
*VRZH	4	4⅝ x 5¼	353	1000-1600
*140-HS	6	4¼ x 5½	468	1000-2250
*140-HK	6	4½ x 5½	525	1000-2250
*145-HK	6	5¼ x 6	779	1000-2000
6-WAKH	6	6¼ x 6½	1197	800-1600
6-NKH	6	7 x 8½	1962	600-1050
6-LRH	6	8½ x 8½	2894	600-1050

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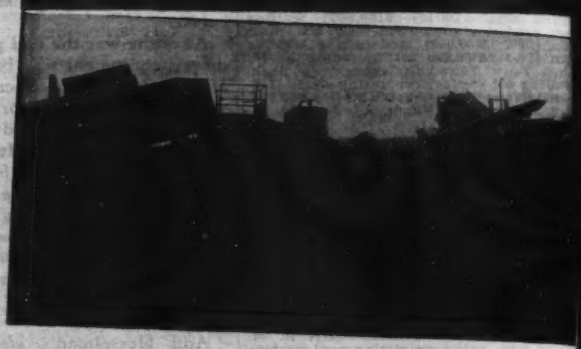

Before—

Beu & Sons, Sumner, Iowa, "190-G" Universal crushing, screening and loading plant with 10"x36" jaw crusher, is shown producing aggregates near Pine Lake State Park, Hardin County, Iowa. Output averaged 1,500 yards per 10½ hour day from an unusually deep pit and ran as high as 2,200 yards in a 12½ hour day.

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After—

The jaw crusher on the "190-G" was readily replaced by a Universal No. 4 hammermill and a Universal primary unit consisting of a 20" x 36" roller bearing jaw crusher with apron feeder was added providing a "tailor made" plant capable of handling the new contract. The revamped plant is shown operating near Ackley, Iowa. As much as 125 tons of aglime per hour have been turned out, averaging better than 100 tons per hour.

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WATER SUPPLY

POSED WORK

d, Anderson — Exten. waterlines with line to go completely around city and suburbs. $40,000 or more. V. Lee, ...derson, engr.

d, Beloit—City, WW, $25,000, Henry B. ...y & Assoc., 139 E. Market St., Indian... engrs.

a., New Orleans—Pub. Housing Auth., ...A, 1205 Electric Bldg., 7 and Taylor ... Fort Worth, 2, Tex., water and sewer ...rvs. $141,900. Applied to FWA. Godat ...ert, 314 Terminal Bldg., engrs.

J., Stanhope—Boro, Boro Hall, reservoir. ...000. F. W. Salmon, Main St., engr.

x., Houston—Bids soon 8 and 12 in. ...rmains, Mack, 67 and 69 Sts., $22,000 ...roved; 6 well pump. units, installations, ...000 approved. G. L. Fugate, City Engi... Dpt., engr.

x., Longview—City, WW sys. imprvs. ...,000. Preese & Nichols, 407 Capps Bldg., ...t Worth, engrs.

t., Burlington—Municipality, 1 m.g. ...ge reservoir. C. H. Power, Burlington, ...

d, Sarnia — Municipality, watermains, ...000. J. C. Monteith, City Hall, engr.

..., St. Georges De Beauce—Town, P. ...haud, secy., WW sys. $270,000. Cre... & Cote, 48 Wellington St., Sherbrooke, ...

S ASKED

Bids Asked August 18

..., Sherbrooke—A. Deslauriers, city clk., ...m. U. S. g. p. d. c., municipal filtration ...nt, 2 mixing chambers 2 coagulating ...ins, 10 filter units, filter pump room, ...rating room, chemical and boiler room, ...,000. H. G. Hunter, c/o City, engr. J. ... Genest, mayor.

Bids Asked August 21

t., Galesburg—City, c/o E. D. Lindberg, ...yor, City Hall, 13725 ft. 6- to 12-in. c.i. ...rmains, incl. valves, hydrants and valve ...es, Ill. 11-303-N, $60,000. FWA. Plans ...osit $25. A. O. Nordheim, city engr. ...ley Engrg. Co., Muscatine, Ia., constr. ...rs. CD 7/19—ENR 7/27.

Bids Asked September 7

..., Midland—Midland Water Co., 843 Mid... Ave. Constr. 1 filtration plant and ap...tenances. Plans deposit $25; Morris ...ow, Inc., Engineers, 1312 Park Bldg., ...sburgh, engrs.; adv. ENR 8/10.

Bids Asked September 18

..., Dyersburg—City at Office City Clerk, ...r imprvs. consisting of iron removal plant ... appurtenant work; plans deposit $25; ...k and Veatch, 4706 Bway., Kansas City, ... consult. engrs. L. D. Hamner, mayor, ...r. Hart, city recdr.; adv. ENR 8/10.

W BIDDERS

..., Hogansville—City, Mayor, J. R. Hines, ...r Hall July 31, pump. station and water ...ation plant addns., from Loftis Utilities ..., 45 Mangum St., S.W., Atlanta, $29,500. ...d 7/17—ENR 7/20.

..., Pascagoula—D. J. Simmons, Pasca... ..., constructing 200,000 gal. steel tank ... tower, from Chicago Bridge & Iron Co., ...N. 50 St., Birmingham, Ala., $17,899. ...d 6/7—ENR 6/15.

..., Akron—City, M. L. Davis, new water ... to airport industrial area, from Shullo ...str. Co., 1208 Home St., $91,885. Est. ...700. CD 7/5—ENR 7/13.

..., Aliquippa—Boro of Aliquippa, E. ...itt, secy., July 28, 200,000 gal. per day ...el tubing water wells, from Ohio Drilling ..., Massillon, $17,876 for 6 single case. Est. ...000. CD 7/17—ENR 7/20.

...r., Houston—City, 8 in. watermains, 12 ... Temple and Oxford Sts., from C. W. ...rge, 108 E. 6½ St., $21,504.

NTRACTS AWARDED

..., N. J., Dover—U. S. Eng., 6 and Walnut ..., Phila., Pa., water sys., to Cestone ..., Verona, N. J., $18,804. Awarded 8/2.

..., Columbus—City, 11,700 ft. water... ...in Karl and Cooke Road sections, to ...hal Co., 2367 Canterbury Rd., $73,105. ...d 5/17; erecting 1 m. g. water storage ...k in Karl Rd., to Chicago Bridge & Iron ..., 332 S. Michigan St., Chicago, Ill., $16,... P. W. Mastnal, city engr.

Symbols and Abbreviations Include:

† Federal Government
★ Project of $500,000 or over
ENR Engineering News-Record
CD Engineering News-Record Construction Daily
A-E-M Architect-Engineer-Management type of contract

Projects—By Size

Construction projects here reported cover the United States and Canada, are of these minimum sizes or larger; water supply, earthwork, waterworks, $15,000; other public works $25,000; industrial buildings, $40,000; other buildings, $150,000.

Classes of Construction

(Named in order of Listing)

Water Supply	Latin America
Sewers, Waste Disposal	Public Buildings
Bridges	Commercial Buildings
Streets & Roads	Industrial Buildings
Earthwork, Waterways	Unclassified

Stages Reported

PROPOSED: (except Streets & Roads):
BIDS ASKED (new announcements only. For full calendar, see also preceding issues of ENR):

LOW BIDDERS: On jobs below $500,000 value all low bidder news will be the final reports published on the projects involved except where award is not made to the low bidder. In this case, a supplementary contract award report will be published.

CONTRACTS AWARDED: Except awards to low bidders previously reported in low bidder stage.

Dates shown are of issue in which last previous report was published.

O., Lima—City, Contr. 2, water treatment works addns., to W. K. Saunders Co., 12770 Lyndon Ave., Detroit, 27, Mich., $295,739. J. F. Cupp, city engr.

†Tex., Big Spring—B. J. McDaniel, mgr., City Hall, Contr. 7, 2 pump. stations, Tex. 41-672, to Lippert Bros., 2036 N.W. 23 St., Oklahoma City, Okla. $30,750. FWA. Bids 8/2. CD 7/20.

Que., Ville St. Pierre (Postal District Montreal)—Canadian Car & Foundry Co., Ltd., 621 Craig W. Montreal, 6 in. watermain, to C. J. Dryden, Ltd., 4414 W. Ste., Montreal, $27,000.

SEWERS, WASTE DISPOSAL

PROPOSED WORK

Calif., Loma Linda — Bd. Supervs. San Bernardino Co., Court House, San Bernardino, sewage disposal plant and sanitary sewers, $125,000.

Ind., Frankfort—Bd. P. Wks., A. R. Lucas, mayor, chn., P. Hufford, secy., City Hall, making plans 60 in. rein.-con. trunk sewer exten. $50,000. Chas. Hurd, 1039 Architects & Builders Bldg., Indianapolis, Zone 4, consult. engr.

†Kans., Liberal—City, H. Shorb, mayor, City Hall, sewage plant, Kan. 14-253. $55,000. FWA. Wilson & Co., Salina, Kan., engrs. CD 8/31—ENR 9/2.

†La., New Orleans—Pub. Housing Auth., NHA, 1205 Electric Bldg., 7 and Taylor Sts., Fort Worth, 2, Tex., sewer imprvs., La. 16-266. $32,301. Applied to FWA. Fromhers Associates, 226 Carondelet St., engrs.

Pa., Pittsburgh—Allegheny Co., Pittsburgh, plans sanitary and storm water sewers and sewage pump facilities. $30,000.

Puerto Rico, Sabana Grande—Municipality, plans sanitary sewerage system. $150,000.

Ont., Orillia—Municipality, S.W., G. Rose, clk., storm sewer, $35,000. A. Larkin, Town Hall, engr.

BIDS ASKED

Bids Asked August 14

B. C., Dawson Creek—Secy. Dpt. Transport, Ottawa, Ont., sewage treatment plant. $45,000. Plans deposit $10.

Bids Asked August 17

†S. C., Parris Island—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash., 25, D.C., sewerage sys., NOY 10507.

Bids Asked August 21

N. C., Burlington—City, J. A. Baynes, clk. and treas., approx. 5 mi. 8 and 10 in. sanitary sewer mains. Lindberg Engineers, City Hall, engrs. Plans deposit $25. E. B. Horner, mayor.

Bids Asked August 24

Pa., Manheim—Borough of Manheim Auth., Manheim, approx. 31,000 lin. ft. 8 and 10 in. vitr. sewer lines and miscellaneous appurtenances in sanitary sewer sys. Plans deposit $20. Robert Hall Craig Estate, 232 N. Third St., Harrisburg, engrs., and Albright & Friel, Inc., 1520 Locust St., Phila., Zone 7, consult. engrs., adv. ENR 8/10.

Bids Asked September 7

Fla., Jacksonville—City, c/o H. D. Peters, sanitary engr., brick, rein.-con. incinerator. $90,000. Extended date. W. Sheddon, city engr. CD 7/26—ENR 8/3.

LOW BIDDERS

Calif., Long Beach — City, July 31, vitr. clay sanitary sewer in Sewer Dist. 13D-1 and in Sewer Dist. 13E-2, from Leko & Radish, 3014 Worthen Ave., Los Angeles, $33,881 and $28,150 respectively. Sewer Dist. 13E-1, from J. E. Popovich, 1444 W. 218 St., Torrance, $28,150.

Conn., Groton—Borough, Bd. of Warden & Burgesses, 359 Thames St., July 31, sanitary sewers, various streets, from Campanella & Cardi Constr. Co., 50 Sprague St., Providence, R. I., $47,773. CD 6/24—ENR 6/27.

Md., Baltimore—City, Bd. Awards, City Hall, July 28, sewers, Contr. 343, from Square Constr. Co., 115 S. Haven St., $215,-200.

†Mich. Gratiot Twp. (sta. Detroit)—Gratiot Twp., July 26, 32,290 lin. ft. 8- to 36-in. sewers, Mich. 20-200, from Chris Nelson & Son, 415 E. Hudson Ave., Royal Oak, $100,-419. FWA. George Jerome & Co., 1756 Natl. Bank Bldg., Detroit, engrs. CD 6/14—ENR 6/15.

Tex., Houston—City, c/o M. H. Westerman, secy., City Hall, July 19, storm sewers on E. 24, Yale, Harvard, Cortland, E. 22, Columbia and Oxford Sts., from Elder Constr. Co., 2006 Carrolton St., $193,937. (Correction—low bidder). CD 7/25—ENR 7/27.

CONTRACTS AWARDED

O., Cincinnati—City, sewer diversion in Evans St., to Foley Constr. Co., Boudinot Ave. & C. & O. R.R., $83,832. H. H. Krantz, city engr.

Tex., Dallas—City, vertical sewage pump. units, to Martyn Bros., 911 Camp St., approx. $25,000. Bids 7/12. CD 6/27—ENR 6/29.

Que., La Salle—Town, A. Gravel, secy., sewers, Distr. 3, to Thomas Const. Co. Ltd., 5823 Terrebonne Ave., Montreal, $112,000. CD 6/28—ENR 7/13.

Que., Montreal — Municipality, J. A. Mongeau, city clk., sewers in Glencoe Ave. and projected street, to Spino & Accuras, 7709 St. Lawrence St., $26,154.

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BRIDGES

PROPOSED WORK

Ind., Anderson—Madison Co., C. V. Wi... sor, surveyor, Courthouse, one 50 ft. ... one 80 ft. concrete bridges over Pipes... in northern part of county. $25,000 or m...

Kentucky—Dpt. Hys., Frankfort, rejec... bids July 28 addn. of sidewalk and streng... ening bridge over Cumberland River, IP... 163, Harlan Co. CD 8/1—ENR 8/3 under ...

O., Canton—Bids soon new bridge o... East Creek on 11 St. S.E. $96,194. J. E... ler, City Hall, city engr. CD 4/6—E... 4/13.

Ontario—Province of Ontario, Toron... bridge over Sydenham River, Wallaceb... $50,000. Dpt. Hys., Toronto, engrs.

Ont., Kenora—Province of Ontario, ... Ministry Planning & Development, Toron... plans bridge to Coney Island and constru... ing Major Tourist Park and esplan... around lake-front. $100,000. Dpt. P. W... Toronto, engr.

Que., Quyon — Provinces of Quebec a... Ontario, Dpt. P. Wks., Quebec City, Q... and Toronto, Ont., bridge over Ottawa Ri... $200,000.

BIDS ASKED

Bids Asked August 15

Maryland——State Roads Comm., Ba... more, 4 span, 126 ft. continuous concr... slab bridge on present concrete piles, ... N. E. Creek, Main St., Northeast, etc., Ce... Ce 235-3-257, Cecil Co., plans deposit ... double 8 ft. span box culvert over branch ... North Run on Park Heights Ave., Ca... B-498-1-411, Baltimore Co. Plans deposit ...

Bids Asked August 22

Ohio—State Hy. Dpt., Columbus, continu... steel beam bridge 0.408 mi. with concrete d... on altered existing stone substructure ... new capped-tile bents over Deer Creek ... Sect. 1 of SH 463, Ross Co. $34,560.

Bids Asked August 23

Louisiana—State Dpt. Hys., Baton Rou... reconstructing 8 timber pile trestles, e... 0.853 mi. Arcadia-Minden Hy., S. P., 1-44-... F.A.P. Su-A-FAP 386 (1) Bienville Paris... Plans deposit $6.

Bids Asked August 24

California—State Div. Hys., State Bld... Los Angeles, repairing bridge across C... tonwood Creek, 35 mi. east of San Die... XI-SD-200-C, San Diego Co. G. T. McC... Pub. Wks. Bldg., Sacramento, state ... engr.

LOW BIDDERS

California—State Div. Hys., Los Ange... Aug. 2, repairing truss span of existing bri... across Santa Clara River, Ventura Co., fr... J. & B. Rocca, Box 1202, Stockton $64,4... G. T. McCoy, state hy. engr. CD 7/17—E... 7/20

Indiana—State Hy. Comn., Indianapo... Aug. 1, bridge, Vermillion Co., from W. ... Scheirer, Frankfort. $49,351; est. $41,1... bridges, Tippecanoe and Davies Counti... from Smith & Johnson, 1799 Kentucky Av... Indianapolis, Zone 44. $105,145 and $81,4... respectively. est. $150112 and $94,140 ... spectively. CD 7/21—ENR 7/27.

West Virginia—State Road Comm., Charl... ton, imprv. Tanner Creek Bridge S-16... Gilmer Co., from W. R. Orders, St. Alba... $46,041; Superior Bridge 1598, McDowell C... from Pocahontas Constr. Co., Lewisbu... $58,573. CD 6/21.

Texas—D. C. Greer, engr. State Hy Dp... Austin, Aug. 1, 0.034 mi. Tehuacana Cr... Bridge, Freestone Co., and 3 bridges ... Neches River, Angelina and Houston Co... ties, from N. C. Larson, Corsicana, $94,... and $131,965 respectively, est. $125,000 ... $120,000 respectively; 0.076 mi. overp... Nolan Co., from J. B. Clardy Constr. C... 2212 Goldenrod St., Fort Worth, $55,5... CD 6/24.

CONTRACTS AWARDED

O., Tiffin—Bd. Comrs. Seneca Co., re... con. beam bridge over Honey Creek on T... Road 77-L in Bloom Twp., to R. L. Wh... lock, Christiansburg, $55,847. Bids ... G. W. Fling, Tiffin, co. engr.

STREETS AND ROADS

PROPOSED WORK

Puerto Rico—Insular Dpt. Interior, S... Juan, plans completion of construction ... following secondary roads, Rabanal-Cid... Aibonito-Cayey-Salinas, Tanama-Adjunt... Coabey-Jayuaya, Sabana Grande-Mari... Barros-Hormigueros, incl. excavations, ... ford foundation, macadam course, asph... surfacing, drainage structures, etc. $156,0...

BIDS ASKED

Bids Asked August 14

Md., Solomons—Yards & Docks, Na... Dpt., 18 St. and Constitution Ave. N.W... Wash., 25, D. C., resurfacing roads at Nav... Amphibious Training Base, NOY 19467.

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ENR-8-10-44

STREETS, etc. (Bids Asked, Cont'd.)

Bids Asked August 15

Ill., Carlyle—J. T. Goldsmith, County Bldg., gravel or concrete stone surfacing 3.8936 mi. Over $25,000.

Mich., Three Rivers—J. H. Lisner, city clk., City Hall, hot mix bituminous concrete resurfacing 7,600 sq. yd. streets.

Pennsylvania—At office J. U. Shroyer, secy. Hys., Harrisburg, bituminous on crushed aggregate surfacing 4,850 ft. Route 09023, Sec. 1, Warminster and Upper Moreland Twps., Harboro Borough, Bucks and Montomery Counties; plain concrete curbing, concrete sidewalks, sidewalk surfacing 741 ft. Route 225, Sect. 7, Traffic R. 228, Chester, Nether Providence Twp., Delaware Co.; bituminous on native stone; type B or crushed aggregate surfacing, 4,336 ft. Route 31111, Sect. R-1, West Mahoning Twp., Indiana Co.; bituminous on native stone type B or crushed aggregate surfacing, rein.-con. bridge 436 ft. Paupack Eddy Bridge Route, Hawley Boro, Wayne Co.; bituminous on native stone type or crushed aggregate surfacing, rein.-con. bridge, also bituminous surfacing for adjustment 375 ft. Tracyville Bridge East Honesdale Route, Honesdale Borough, Wayne Co.

West Virginia—State Road Comm., D. McClaugherty, secy., Charlestown, road mix surfacing 2.9 mi. Secondary Route 11 toward Sardis Road (Sec. Rte. 7), Defense Access Raw Material Army Proj. DARM 41-A(1), Item 16, surface treatment 5.3 mi. Saltwell-Francis Road (Secondary Rte. 13/2, 13/3 and 12) Defense Access Raw Material Army, Proj. DARM-41-A (1), Item 10, both Harrison Co.; asphaltic concrete surfacing 1.4 mi. Penna. State Line toward U.S. Route 19 Road (Secondary Route 53), Defense Access Raw Material Army, Proj. DARM-41-A(1), Monogalia Co.

Bids Asked August 16

Louisiana—State Dpt. Hy., Baton Rouge, type sodding specified portions existing roadway 3.907 mi. S. P. 15-06-12, F.A.P. SN-FAP 196-C(1), Caldwell Parish.

Bids Asked August 18

Minnesota—State Hy. Dpt., St. Paul, 3,937 cu. yd. subgrade excav., 61,463 cu. yd. sand and gravel base on 3.7 mi. S.P. 1120-07 (T.H. 371-19), Plans deposit 70c.; 14,063 cu. yd. gravel base 4.6 mi. S.P. 7312-06 (T.H. 55-142) and 7313-05 (T.H. 55-142), Plans deposit $1.40. Est. over $25,000. O. L. Kipp, St. Paul, ch. engr.

N. J., Ewing (P. O. Trenton)—Town of Ewing, Municipal Bldg., Ewing, bituminous penetration macadam on macadam found, surfacing Southard St. B. F. Stratton, 143 E. State St., Trenton, engr.

Bids Asked August 22

★**Ohio**—State Hy. Dpt., Columbus, rock asphalt surface course 2.144 mi. Sects. Ashland and West Salem of SH 139 and 140 US 42, Ashland and Wayne Counties; asphaltic concrete resurfacing 1.211 mi. Sect. Conneaut of SH 13, Ashtabula Co., $33,870; 1.305 mi. Sects. Wapakoneta and A-1 of SH 198 and 165, US 33 Auglaize Co., $27,100; 1.291 mi. Sect. East Liverpool of SH 502, US 30, Columbiana Co., $15,400; 2.873 mi. Sects. Euclid and Cleveland of SH 520, Cuyahoga Co., $152,600; 1.678 mi. Sects. Delta, F and O of SH 20, US 20, Fulton Co., $29,660; 1.503 mi. Sect. Cincinnati of SH 10, US 22, Hamilton Co., $46,100; 1.283 mi. Sects. H, Oak Hill, and G of SH 400, Jackson Co., $30,500; 1.307 mi. Sects. P and Brilliant of SH 7, $12,800; 0.506 mi. Sect. N and Rayland of SH 7, $6,030, both Jefferson Co.; 1.478 mi. Sects. Zanesville and I of SH 1 and 10, US 40 and 22, Muskingum Co., $23,600; 1.26 mi. Sects. Bells Valley and H of SH 352, US 21, Noble Co., $22,480; 3.632 mi. Sects. O and M of SH 319, US 224, Seneca Co., $44,300; 1.553 mi. Sects. Q and Akron of SH 56, $56,600; 0.497 mi. Sect. Uhrichsville of SH 270, US 36, Tuscarawas Co., $7,230; 3.296 mi. Sects. Ohio City, E and B of SH 265, Van Wert Co., $66,960; 5.144 mi. Sects. B-1 and B-2 of SH 53, Wood and Ottawa Counties; bituminous treatment 22.29 mi. Ashtabula and Trumbull Counties, $17,618; 6.5 mi. Knox Co., $17,090; 16.611 mi. Portage and Summit Counties, $19,234; 7.7 mi. Warren Co., $18,127; grading, drainage structures and stabilized surface course and concrete on 0.124 mi. Sects. N and Gallon of SH 261 and 269, Crawford Co., $7,948; erosion control 3.637 mi. Sect. I of SH 883, Medina Co., $18,500.

Bids Asked August 23

California—State Div. Hys., Sacramento, plant mix surfacing repairs 1 mi. between El Cerrito Hill Overhead and Richmond, Alameda and Contra Costa Counties. G. T. McCoy, state hy. engr.

Bids Asked August 23

Louisiana—State Dpt. Hys., Baton Rouge, concrete pavement repairs and constructing sand clay gravel and iron ore surfaced shoulders 59.6 mi. S. P. 24-06-07, 25-01-09 and 25-02-07, Defense Access Army Reservation Proj. DA-WR 24(1), Rosepin-Many Hy. Vernon and Sabin Parishes. Plans deposit $1.

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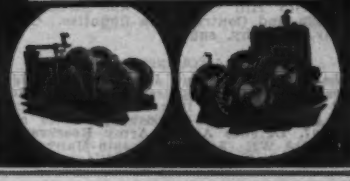

STREETS, etc. (Bids Asked, Cont'd.)

Bids Asked August 15

Kentucky—Dpt. Hys., Frankfort, Bitumi-ous resurfacing 4.54 mi. Shepherdsvil Boston Rd., SP 15-74-SP 99-324, Bu Nelson Counties; 6.147 mi. Tollesboro-Carmel Rd., Group 18, Maintenance Proj Fleming and Lewis Counties; grad draining 0.842 mi. Centertown-Island R SP 92-204, Ohio Co.

Bids Asked

Kentucky—Dpt. Hys., Frankfort, reject bids July 28, imprv. 0.842 mi. Centerto Island Rd., SP 92-204, Ohio Co. CD 1/ ENR 8/3, under LB.

Bids Asked

†**R. I., Newport**—City, P. Wks. Dpt. C Hall, repairing and paving Van Zandt, Ki and Guard Sts. Chas. A. Maguire & A ciates, 1515 Turks Head Bldg., Provide engrs.

LOW BIDDERS

†**California**—Pub. Roads Admin., 720 Phel Bldg., San Francisco, Aug. 3, imprv. 1 mi. Siskiyou Co., from Phoenix Constr. C P. O. Box 906, Bakersfield, $70,984. CD 7/

California—State Div. Hys., P. W Bldg., Sacramento, Aug. 2, imprv. 6.5 Del Norte Co., from John Burman & S 2760 Harrison Ave., Eureka, $34,847. G. McCoy, state hy. engr. CD 7/24.

Calif., Benicia—City Clerk, City Ha Aug. 1, imprv. 5.6 mi. streets, Street Asse ment Dist. No. 1, from Parish Bros., 61 St., Sacramento, $313,461. CD 7/20.

Connecticut—State Hy. Dpt., Wm. J. C comr., State Office Bldg., Hartford, Aug. stone and bit. surfacing 300,000 sq. various streets, from White Oak Excavator Inc., 59 East Main St., Plainville, $22, CD 7/28.

D. C., Wash.—District Comrs., Distri Bldg., Aug. 2, imprv. 9,000 lin. ft. combin tion concrete curbs and gutters and abo 2,700 tons bituminous surface course, va ious roadways, from Highway Eng. Constr. Co., 7 and T Sts. N.E., $65, 20,000 sq. yd. concrete alley pavement from Donaldson Paving Co., Inc., 31 Potom Ave. S.W., $56,806.

Ill., Chicago—O. E. Hewitt, comr. Dpt. Wks., City Hall, July 28, concrete pavi W. Pershing Rd., from H. G. Goelitz C 5757 W. Ogden St., $130,615. CD 7/21.

Indiana—State Hy. Comn., Indianapol Aug. 1, imprv. 5.617 mi. Allen Co., from H. Ringwald & Sons, Chillicothe, O., $4 943; 0.608 mi. Marion Co., from Uni Asphalt Constr. Co., 239 W. Georgia S Indianapolis, Zone 2, $38,960. Est. $42, CD 1/21—ENR 7/27.

Louisiana—State Dpt. Hys., Baton Roug July 26, imprv., State Proj. 737-06-(Contr. 1) Vernon Parish, from O. L. Al nathy, Sulphur, $141,779. CD 7/17—EN 7/20.

Louisiana—State Dpt. Hys., Baton Roug Imprv. 86.2 mi. Rapides Parish, from Ca ruth Constr. Co., National Bank Bldg Baton Rouge, $48,891. Former bids rejecte CD 6/20—ENR 6/22, under LB.

Louisiana—State Dpt. Hys., Baton Roug Aug. 1, imprv. 124.3 mi. Vernon Parish from W. R. Aldrich & Co., Box 272, Leesville, $100,300; 99.4 mi. Natchitoches Parish from Carruth Constr. Co., National Bank Bldg., Baton Rouge, $118,100. CD 7/24 ENR 7/27.

Maryland—State Roads Comn., Baltimor Aug. 1, imprv. Jarboesville-Leonardtown Rd S.M. 265-511, from E. Stewart Mitchell, 81 Ridgewood Ave., Baltimore, $70,794. CD 7/

†**Md., Indian Head**—Pub. Roads Admin 18 and F Sts. N.W., Wash., 25, D. C., Aug. access road to Naval Powder Factory, Proj Md. DA-NR-4 F(3), from Potts & Callahan 500 W. 29 St., Baltimore, $196,510. CD 7/ —ENR 7/27.

Mass., Boston—City, P. Wks. Dpt., Ci Hall, July 25, bituminous concrete pavin Corbett, Maxwell, Oakridge, Old Morton an Selden Sts. from E. M. Carriers, Whitfor St., Roslindale, bituminous macadam ba $42,116. CD 7/21.

Michigan—State Hy. Dpt., Lansing, Aug 3, imprv. 3,766 sq. yd. Gratiot and Isabel Counties, from Bridgeport Core Sand Co 125 Davenport, Saginaw, $25,537***1.5 m Lenawee Co., from Taylor Bros. Co., Inc 790 Haynes St., Birmingham, $75,833***0.7 mi. Lenawee Co., from Louis Garavaglia Son, 4514 Burns Ave., Detroit, $262,737. C 7/26—ENR 7/27.

Miss., Pascagoula—City, c/o W. R. Gulle mayor, City Hall, surfacing comprising s or parts of 22 streets from Clark Bro Constr. Co., Jackson, $47,822. Est. $50,45 D. Simons, Pascagoula, engr.

New Hampshire—State Hy. Dpt., Concor July 28, imprv. 3.319 mi. Coos Co., from De Gregorio, 18 Wells St., Worcester, Mass. $41,375. CD 7/20.

Ohio—State Hy. Dpt., Columbus, July 2 imprv. 1.019 mi. Mahoning Co., from Kan O'Hara & Haenny, 65 W. Indianola Ave. Youngstown, $61,750. Est. $56,600. CD 7/

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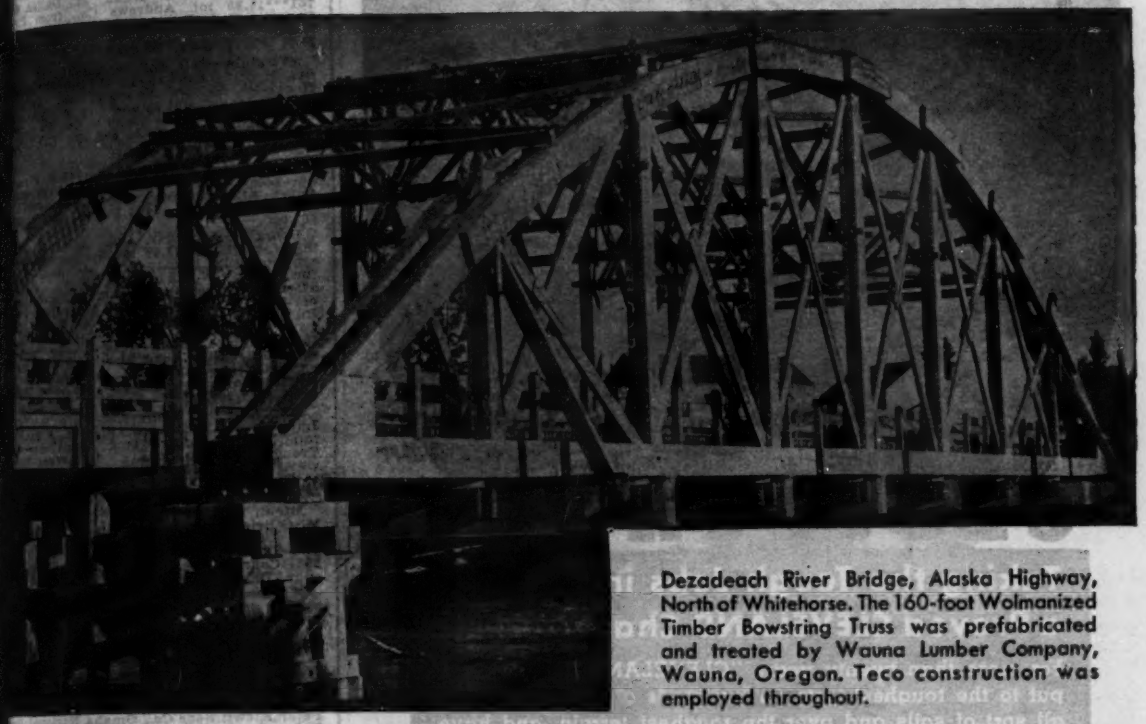

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STREETS, etc. (Low Bidders, Cont'd.)

★**Texas**—State Hy. Comn., B. P. Gossett, chn., Austin, Aug. 1, imprv. 12.324 mi. Mason and Gillespie Counties and 5.944 mi. Live Oak Co., from M. B. Killian & Co., Sabinet Rd., San Antonio, $275,290 and $[illegible] respectively***15.007 mi. Dallam and Sherman Counties, from Bell & Braden, Hervey Hotel Bldg., Amarillo, $444,923***1.46 mi. Comal Co., from Colglacier & Hof, Seguin Rd., San Antonio, $[illegible]; 41.53 mi. Morris, Cass and Marion Counties, from Holland Page, Georgetown Rd., Austin, $[illegible]***3.595 mi. Sabine Co., from [illegible] Constr. Co., Paris and Bourbon Sts., Dallas, $62,378***1.999 mi. Collin Co., from Walker & Bowden, 5213 E. Grand St., Dallas, $[illegible]761***16.85 mi. Andrews Co., from Pate Constr. Co., Pampa, $193,220; 7.396 mi. Nolan Co., from E. Loyd, 3101 Stadium Dr., Fort Worth, $394,870. CD 6/24.

†**Virginia**—Pub. Roads Admin., 18 and Sts. N.W., Wash. 25, D. C., July 28, paving Henry G. Shirley Memorial Hy., Arlington and Fairfax Counties and city of Alexandria, from Robert W. Cleveland & Co., 72 M. Fr St., East Orange, N. J., $93,360. CD 7/21.

CONTRACTS AWARDED

†**Calif., Muroc**—U. S. Eng., 741 S. Figueroa St., Los Angeles, Zone 14, addnl. pavement, Army Airfield Contr. W-04-353-eng-767, A. H. Knebig, Jr., 2404 S Ave., Los Angeles, $61,000.

Georgia—State Hy. Dpt., Atlanta, w[illegible]ing, resurfacing 11.05 mi. Bainbridge-Donalsonville Rd., Decatur Co., to Sam Fiala, Inc., 293 North Ave. N.W., Atlanta, $73,420***resurfacing 5.8 mi. Atlanta-Jonesboro Rd. Fulton Co., and 3.346 mi. Peachtree Rd., De Kalb Co., to Warren Bros. Road Co., 38 Memorial Dr., Cambridge, Mass., $50,055 and $37,497 respectively***grading, surface treating road and 2 bridge culverts on 9.61 mi. Miller Rd., Muscogee Co., to Coffee Const. Co., Eastman, $27,430. Grand total $317,300. Bids 7/25.

Ill., East St. Louis—City, c/o Bd. Local Imprvs., L. J. Dougherty, pres., City Hall, imprv. resurfacing, etc., Front St. from Trendley to Spring Ave., and West Broadway, Eads Bridge approach to Front St., to Maclair Asphalt Co., 4211 State St., $[illegible]873. Bids 7/17. CD 3/24—ENR 3/30.

Mich., Detroit—Wayne Co. Rd. Comrs., M. O'Brien, chn., pavement, curb, sidewalks, etc., 1.1 mi. Mound Rd. between Canif Ave. and Davison Ave., to Thos. E. Currie Co., 5551 Conner Ave., $81,428. L. Smith, Detroit, engr. Bids 7/15.

Minnesota—State Hy. Dpt., St. Paul, crushing, screen, load and haul about 44,500 cu.yds. gravel, production of mineral aggregate for traffic-bound wearing course and for stockpiles for Maintenance Div., Owatonna, to E. Olson & Sons, Albert Lea, $[illegible]. Bids 7/21. CD 7/6—ENR 7/13.

★**Nebraska**—Dpt. Roads & Irrigation, Lincoln, imprv. 9.6 mi. Butler Co., to Peter Kiewit Sons Co., Omaha National Bank Bldg., Omaha, $515,915. CD 7/27—ENR 7/[illegible] under L.R.

★**Ohio**—State Hy. Dpt., Columbus, imprv. 6.351 mi. Ashland, Medina and Wayne Counties and 1.598 mi. Medina Co., to Ohio Road Imprvt. Co., Chamber of Commerce Bldg., Columbus, $164,454 and $35,903 respectively est. $164,500 and $37,300 respectively***3.578 mi. Crawford Co. and [illegible] mi. Lorain Co., to Ohio Engineering Co., 105 S St., Lorain $37,695 and $96,613 respectively est. $37,100 and $102,700 respectively ***10.075 mi. Clinton Co., to Clinton Construction Corp., 114 E. Sugartree St., Wilmington, $71,536 est. $72,400***2.799 mi. Muskingum Co., to Muskingum Valley Asphalt & Supply, Inc., 526 Masonic Bldg., Zanesville, $[illegible] est. $55,520***3 mi. Ross Co., to Max Keller, Inc., 595 W. Goodale St., Columbus, $65,649 est. $57,300***2.533 mi. Summit Co., to Stark Constr. Co., 109 N. Union St., Akron, $49,281 est. $55,500***2.563 mi. Stark and Summit Counties to McCourt Constr. Co., 720 Home Ave., Akron, Zone 20, $44,791 est. $45,500***1.228 mi. Washington Co., to Valentine & Co., W. 9 Ave. and Delashmutt St., Columbus, $92,127 est. $113,400***[illegible] mi. Crawford and Huron Counties, to A. J. Monyak, W. Center St., Burton, $32,910 est. $34,762***11.94 mi. Putnam Co., to L. J. Edgington & Sons, 1230 S. Main St., Findlay, $30,439 est. $34,278. Grand total $[illegible] Bids 7/26. Received no bids July 26, imprv. 10.231 mi. Muskingum Co., 5.549 mi. Greene Co. CD 7/10.

O., Cincinnati—City, W. R. Kellogg, mgr. City Hall, surface treating streets and thoroughfares, to L. P. Cavett, 500 Shepherd Ave., Lockland, $87,648. Bids 6/27. R. E. Kranz, city engr.

†**O., Columbus**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, addnl. hard surfacing east end open storage area at Columbus Army Service Force Depot, to General Constr. Co., 237 S. High St., $[illegible].

O., Dayton—Bd. Comrs. Montgomery Co., Dayton, resurfacing 3.5 mi. Union Rd. from State Route 35 to Trotwood, to Boyd-Cook Co., Gas & Electric Bldg., $[illegible]. Bids 7/10. V. C. Smith, Dayton, co. engr.

O., Hamilton—Bd. Comrs. Butler Co., Hamilton, seal coating 50 mi. various roads to L. P. Cavett, 500 Shepherd Ave., Lockland, $35,000. Bids 7/7. F. M. Hammerle, Hamilton, co. engr.

...HTS, etc. (Contracts Awarded, Cont'd.)

...Louisiana—Bd. Comrs. Fairfield Co., ...ainous surface treatment 44.75 mi. vari- ...roads, to George W. Van Camp, 311 W. ...d St., Circleville, $42,160. L. Wolford, ...ector, co. engr.

...Madison—Bd. Comrs. Marion Co., drag, ...ss treating various roads, to N. S. ...r, Co., 116 E. Johnson St., Upper San- ..., $66,618. W. W. Johnson, Marion, ...engr.

...Port Clinton—Bd. Comrs. Ottawa Co., ...rfacing 43.24 mi. various roads, to H. ...man, Genoa, $42,780. D. J. Nissen, Port ..., co. engr.

...St. Clairsville—Bd. Comrs. Belmont Co., ...Clairsville, resurfacing Neff-Willow Grove ... in Richland and Pultney Twps., to ...State Asphalt Corp., S. Bway., Martins ..., $66,393. G. C. Travis, St. Clairsville, ...engr.

...Klamath Falls—Yards & Docks, ...Dpt. 18 St. and Constitution Ave. ...Wash., 25, D. C., paving for access ..., barracks, storehouse, etc., Marine ...racks, NOT $594, to C. A. Dunn, Kla- ...Falls, $123,969.

...Toronto—F. J. Conboy, mayor, as- ...tic concrete paving Mount Pleasant ... to Rayner Constr. Ltd., 29 Commercial ..., Leaside, $30,182. R. C. Harris, c/o City, ...

...Quebec—Dpt. National Defense (Air), ...awa, Ont., paving and constructing roads, ... National Paving & Contg. Co., Ltd., 914 ... Catherine St. E., Montreal, $52,000.

...Montreal—Municipality, J. A. Mon- ..., city clk., paving Ninth Ave., St. ...ain St. and Maplewood Ave., to Charles ...rancesa, Ltd., 5547 Hannet Ave., $28,020. ...Brosseau, City Hall, engr.

...St. Joseph d'Alma—Dpt. P. Wks., ...bec City, and graveling, earthworks on ...d linking St. Joseph d'Alma and Isle ...igne, via Chibougaman Bridge over ...nds Decharge River, to J. R. Theberge, ...ans Sts. Ignace, Chicoutimi, $160,500. CD ...

EARTHWORK, WATERWAYS

PROPOSED WORK

...ex., Athens—Henderson Co. Levee Dist. ...Athens, improv., restoration parts of 15 ... levees. Over $35,000.

...Puerto Rico—Puerto Rico Water Re- ...sources Authority, San Juan, plans new ...nstruction now units, incl. Coamillas Proj- ..., $3,775,400, new turbo-generators in ...yaguez and Santurce, $265,000 and $639,- ... respectively, and $129,250 for connections ...bring power from Ceiba Naval Base, also ...paring plans for new offices and warehouse ...Santurce. $227,000.

...Quebec—Dpt. P. Wks., Quebec, drainage ...Lavaltrie, Lavoie, St. Thomas, L'Assomp- ...n and Joliette, $99,317.

BIDS ASKED

Bids Asked August 24

...California—State Div. Hys., State Bldg., ...Angeles, construct rail and wire bank ...rotection fences placed and sacked con- ...te riprap on portions .6 mi. hys., between ...lamint and Agua Dulce Canyon Rd. and ...tween Newhall and Saugus V11-LA-33, ...PCD, B. Los Angeles Co. G. T. McCoy, ... Wks. Bldg., Sacramento, state hy. engr.

Bids Asked September 18

...Ill., Peoria—State, Dpt. P. Wks. & Bldgs., ...Waterways, 188 W. Randolph St., Chi- ...go, and Greater Peoria Sanitary and ...wage Disposal Dist., at office of Sanitary ..., foot of Darst St., raising, strengthen- ...g earth levee, for constructing rip rap ...se paving, appurtenant work, involv- ...g approx. 56,200 cu.yd. earthwork, at ...ater Peoria Sanitary and Sewage Dis- ...al Works; T. B. Casey, acting ch. engr.; ...r. ENR 5/18. CD 5/17—ENR 5/25.

LOW BIDDERS

...(Calif., Marysville—U. S. Eng., 1209 S St., ...ramento, Zone 5, levee construction along ...ther River from here for 13 mi. north, ...pt. 19th, from H. Earl Parker, 310 Bye St. ...$6,478.

...Fla., Tampa—City, July 31, Hillsborough ...ver Dam, from Lewis & MacDowell, Inc., ...5 Madison Ave., New York, N. Y., $149,000. ...D 7/24.

...Fla., Baton Rouge—U. S. Eng., foot of ...ntania St., New Orleans, 235,000 cu. yd. ...anches Levee in East Baton Rouge Parish, ...t. 16-047-43-2, Item L 315, from Pioneer & ...enders, Dyersburg, Tenn., $56,925. CD ...7—ENR 8/3.

...Maryland—State Roads Comm., Baltimore, ...ec. 1, widening, deepening channel at ...Chesapeake Terminal of Chesapeake Bay ...way, Sys., Contr. Q 470-1-273, Queen Anne ..., from Arundel Corp., Pier 1, Pratt St., ...Baltimore, $25,718. CD 7/25—ENR 7/27.

...New Mexico—Bureau Reclamation, ...Tucumcari, July 22, from L. J. Miles ...str. Co. and E. Loyd, Roaring Springs ...Rd., Fort Worth, Tex., earthwork and con-

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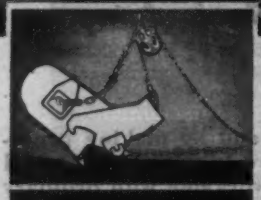

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EARTHWORK, etc. (Low Bidders Cont'd.)

crete, monolithic-concrete siphons, Stati Space 1076, Schedule 5, $145,788; Schedule $127,463; Schedule 7, $143,766; Schedule $53,092***from Morrison-Knudsen Co., In 411 W. 5 St., Los Angeles, Calif., canal c cav., and structures schedule #1, Schedule 3, $251,439***from Brown Bro Albuquerque. Schedule 2, $145,761***fro D. D. Skousen, Albuquerque, canal exca bench flume and structures, Schedule $138,518. CD 5/12, 6/27—ENR 5/18, 6/29.

Pa., Altoona—Pennsylvania R.R., G. Gressitt, ch. engr., Broad St. Sta., Phila July 22, waterway increasing, from A. Stormer & Sons, Altoona. Est. $30,000. 7/17—ENR 7/20.

Tex., Galveston—U. S. Eng., 25 St. an Avenue P, Galveston, flood discharge cha nel, Colorado River, Intracoastal Waterwa 815,900 cu.yd. from McWilliams Dredgi Co., Hibernia Bldg., New Orleans, La., a prox. $45,721.

CONTRACTS AWARDED

†Calif., Mare Island—Yards & Docks, Nav Dpt., 18 St. and Constitution Ave. N.W Wash., 25, D. C., maintenance dredgin Navy Yard, Spec. 14631, NOY 10203, to Sa Francisco Bridge Co., 503 Market St., Sa Francisco, $146,000.

†Illinois—U. S. Eng., 316 U. S. Court Hous & Custom House, St. Louis 2, Mo., placin approx. 62,000 cu. yd. earth and repairin levee breaks and 156 stations of wave washe levees, Madison Co., to McClanahan Bro Excavating Co., 720 Luckystone Ave., Glen dale, St. Louis 19, Mo. $28,000.

†La., New Orleans—U. S. Eng., foot o Prytania St., 1,500,000 cu. yd. levees, Ite R-370.8, Delhi Levee, Basic Plan, to Coo Constr. Co., Jackson, Miss., 34.44c per cu. y

Miss., Jackson—State Park Supervs., Jack son, dam and spillway in Pike County a Percy Quinn State Park, to Avery & Chap man, Moss Point, $47,300.

†Missouri—U. S. Eng., 10 E. 17 St., Kansa City, Mo., levees for drainage dist., nea Wainwright, to Mike Haase, 2627 Swope Parkway, Kansas City, Mo., $61,250.

LATIN AMERICA

Mexico—Federal Health Ministry, Dr. Gus tavo Baz, secy., Mexico City, will take bid in late fall 8 tuberculosis hospitals in Mexic City, Federal Dist., Zoquipa, Jalisco and Ximonco, Vera Cruz, states. Total est $600,000.

Mexico, Chihuahua—State, Governor Al fredo Chavez, Chihuahua, will pave roa connecting cities of Santa Barbara, El Or and Parral, by own forces. $400,000.

Mexico, Chihuahua—State of Chihuahua, Chihuahua, will construct and repair 15 small schools throughout state, by ow forces. $1,000,000.

Mexico, Chihuahua—State of Chihuahua, Governor Alfredo Chavez, Chihuahua, wil take bids within 90 days constructing dam for irrigation purposes on Florida River i State of Chihuahua. $2,500,000. Federa Government approved and will help finance.

Mexico, Colima—State of Colima, Gov ernor Manuel Gudino, Colima, takes bids dur ing next 5 months, constructing and repair ing schools in large cities. $500,000.

Mexico, Cuernavaca—State of Morelos, Jesus Castillo Lopez, governor, Cuernavaca, will construct and repair all principal streets in city and some outskirts, by own forces. $115,000.

Mexico, Cuernavaca—State of Morelos, Governor Jesus Castillo Lopez, Cuernavaca, will construct entire new water and sewer age system, by own forces. $300,000.

Mexico, Durango—State of Durango, Gov ernor Elpidio Velazquez, Durango, plans 4 small schools for entire state. $500,000.

Mexico, Guerrero—State of Coahuila, Gov ernor Benecio Lopez Padilla, Torreon, wil take bids within 90 days constructing irri gation projects in Guerrero Valley. $300,000.

Mexico, Leon—State of Guanajuato, Gov ernor Ernesto Hidalgo Leon, will con struct and repair streets and highways, water systems, sewage, bridges, irrigation for last months of 1944, with own forces. $500,000.

Mexico, Mexico City—Federal District, Mayor Xavier Rojo Gomez, Municipal Bldg., will construct and repair all roads within half mile of union railroad station, by own forces. $115,000.

Mexico, Mexico City—Owner, c/o Mexican Federal Government, Secy. of Finance, Mexico City, plans constructing, equipping padlock manufacturing plant. $100,000.

Mexico, Monterrey—John Charles Frye, Hipodromo, Mexico City, takes bids late in fall, for construction racetrack with grandstand and clubhouse having 4,000 seating capacity. $500,000.

IN AMERICA, etc. (Cont'd.)

...ico, Monterrey—State of Nuevo Leon, ...ernor Arturo B. De la Garza, Monterrey, ...s constructing civic hospital group.

...ico, Nuevo Laredo—City, Luis Ramiriz ... will take bids within 2 months for ...truction of electric plant. $110,000.

...ico, Pihuamo—City of Pihuamo, will ... bids late in 1944, for construction of ...ric plant to serve this city and sur...ding villages. $100,000. Funds to be ...shed by Federal Electrical Commission; ...idential Palace, Mexico City.

...ico, Puebla—State of Puebla, Governor ...nio Bautista, Puebla, plans meat manu...turing plant, to be operated by State.

...ico, San Juan de Sabinas—City of San ...n de Sabinas, Urbano Riojas, municipal ...sident, takes bids within 90 days for ...struction of school. $306,000.

...ico, Tampico—State of Tamaulipas, ...ernor Magdaleno Aguilar, Tampico, plans ...ets in large cities of state. $1,300,000.

PUBLIC BUILDINGS

...OPOSED WORK

...Calif., San Francisco — Federal Works ...ency, 2232 Fulton St., Berkeley, Zone 1, ...ns by Bernardi, Wickenden, Langhorst & ..., 402 Jackson St., child nursery bldg., ... Francisco State College, Calif. 4-573. CD ...—ENR 4/29.

...Calif., San Pedro—Housing Auth. of City ...Los Angeles, 1401 E. First St., Los Angeles, ...ns by Risley & Gould, 220 S. Westmore... ...l Ave., Los Angeles, site development for ... portable dwelling units and community ..., Lomita and Normandie Aves., Calif. ...; plans by Allen & Lutzi, 6113 Wilshire ..., Los Angeles, site development for 1,000 ...table dwelling units at Gaffey St. and ...mington Blvd., for NHA. Over $150,000 ...h.

...Calif., Wilmington—Housing Auth. of ...y of Los Angeles, 1401 E. First St., Los ...eles, plans by Heitschmidt & Matcham, ...S. Hill St., Los Angeles, site development ...rk for 300 portable dwelling units for ...A. Over $150,000.

...Conn., Plainville—Pub. Housing Auth., ...A. 24 School St., Boston, Mass., received ... bids July 31, grading work, roads utility, ...ns. 6015. CD 7/21—ENR 7/27.

...Fla., Bay Pines—Veterans Admin., Ver... Ave. between H and I Sts. N.W., Wash., ...D. C. 11 addnl. bldgs.

...Md., Aberdeen—U. S. Eng., Standard Oil ...g., Baltimore, making plans addnl. proof ... test bldg.

...N. J., Newark—Pub. Housing Auth., ...NHA, 270 Bway., New York, 7, N. Y., ...ected bids Aug. 1, 150 unit family hous... ..., N. J., 8-9. W. Lehman, 172 Broad St., ...ht. CD 8/3 unds. LB—ENR 7/20.

...N. J., New Brunswick—Pub. Housing ...th., NHA, 270 Bway., New York, 7, N. Y., ...ns by A. Merchant, 1 Elm Row, New ...nswick, 80 unit family, permanent dwell... ...n N. J. 32-1, for New Brunswick Hous... ... Auth., New Brunswick. CD 6/19— ...R 6/22.

...N. J., Upper Deerfield—Bd. Educ. Cumber... ...Co., Seabrook School addn. $49,750. ...A.

...O., Ironton—Allied Chemical & Dye ... Corp., 61 Bway., New York, N. Y., ...talling coal tar distillation and "Tar ...ter" extraction facilities together with ...t. expans., $651,000. Federally financed.

...Okla., Norman—City, voted bonds 3 ..., hospital unit, Okla. 32-201, $175,000. ...A. Noftsger & Lawrence, 2507 N.W. 23 ..., Oklahoma City, archts. CD 4/28—ENR ...

...Pa., Beaver Falls—Beaver County Hous... ...ing Auth., Court House, Beaver Falls, ...ns housing. $3,315,000.

...Pa., Chester—Pub. Housing Auth., NHA, ... Bway., New York, 7, New York. 1,300 ...t dormitory type dwellings, Pa. 3444B.

...Tex., Orange—Pub. Housing Auth., NHA, ...6 Electric Bldg., Seventh and Taylor Sts., ...t Worth, plans by Stone, Pitts, McGinty, ...berg, Werlein, 911 Stuart St., Houston, ... family stop-gap dwelling units. Tex. ...58.

...Va., Portsmouth—Norfolk County School ..., 148 Granby St., Norfolk, plans by J. B. ...ilfert, 103 Cary St., Richmond, and bids ...s addn. Cradock High and Elementary ...hool, Va. 44-16. $354,000. FWA.

...B. C., Trail—Town, civic centre, incl. ... 85x200 ft. ice arena, indoor swimming ..., etc. $500,000. Trail Junior Chamber ... Commerce, interested.

...B. C., Vancouver—Wartime Housing, ... Ltd., 55 York St., Toronto, Ont., 250 ...mes. About $1,000,000.

...Ont., Hamilton—Ed. Governors of Ham... ...ton General Hospital, W. H. Cooper, ..., J. F. Berry, city clk., plans by Hutton

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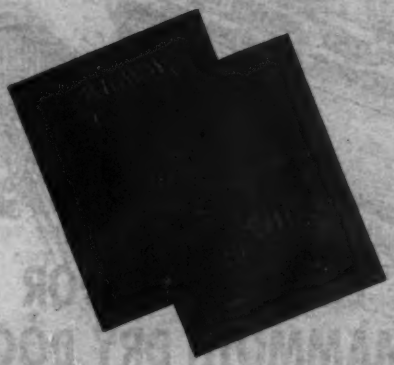

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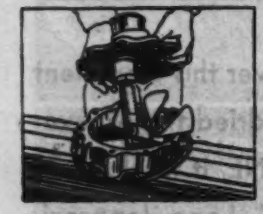

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PUBLIC BLDGS. (Proposed Work, Cont'd.)

& Souter, 36 James St., S., hospital w addn., Mountain Hospital. $1,000,000. 6/13—ENR 6/16.

Ont., Kenora—Province of Ontario, Tor to, plans by Dpt. P. Wks., Toronto, hous aged. $150,000.

Ont., Leamington—Town, F. R. Gregg chn., hospital between Talbot St., west Oak St. Over $150,000.

Que., Shawinigan Falls—City, J. A. Bi dean, mayor, plans by A. Lacourciere, 4 St., new city hall, $275,000. Robt. Duri c/o owner, engr.

Sask., Regina—Secretary Dpt. Munitio & Supply, Ottawa, Ont., bids soon perm nent Naval barracks, for Dpt. Nation Defense (Sea), Ottawa, Ont. $300,000.

BIDS ASKED

Bids Asked in August

†**Me., Freeport**—Federal Works Agenc 99 Chauncy St., Boston, Mass., 1 story, bri school, Me. 17-175-P. $80,000. A. J. Harr man, 38 Shepley St., Auburn, archt. CD 6 —ENR 6/8.

†**Neb., Omaha**—Bishop Clarkson Hospit 36 and Dewey St., nurses home, $300,0 FWA. John Latenser & Sons, 1307 Farna St., archts. CD 6/30—ENR 7/6.

Bids Asked Latter Part of August

†**Minn., Minneapolis**—State Bd. Regent University of Minnesota, Administrati Bldg., Main Campus, 4 story, rein.-con brick, stone nurses training school. $386,0 FWA. C. H. Johnston, 715 Empire Bu Bldg., St. Paul, archt. CD 11/17—ENR 11/2

Bids Asked August 14

†**Mass., Roxbury**—Bd. Directors Ne England Hospital for Women & Children Dimock St., altering 3 story, brick, nurse bldg., Mass. 19-192-N, Columbus Ave. FWA Plans deposit $20 each set. James E Ritchie & Associates, 38 Newbury St., Boston archts.

B. C., Vancouver—Secy. Dpt. Munitions Supply, Ottawa, Ont., stores development Lynn Creek, for Dpt. Natl. Defense (Army Ottawa, Ont. $150,000-$200,000.

Bids Asked August 15

Mich., Bay City—City in Staff Room General Hospital, Columbus Ave., remodel ing General Hospital. J. C. Goddeyne, Ba City Bank Bldg., archt.

†**N. J., Lakehurst**—Federal Works Agenc 101 Park Ave., New York 17, N. Y., 1 story brick veneer, concrete block, school, NJ 28-173. $46,250. L. Kaplan, 31 W. Stat St., Trenton, archt. CD 6/19—ENR 6/22.

†**S. C., Mount Pleasant**—Trustees Mt. Plea ant School, school, SC 38-178. FWA J. D Benson, 31 Church St., Charleston, archt.

Bids Asked August 16

†**Fla., Panama City**—Pub. Bldgs. Admin 18 and F Sts. N.W., Wash., 25, D. C., 1 stor health center, Fla. 8-303. FWA. Smith & Gil lespie, P. O. Box 1048, Jacksonville, archts CD 6/22—ENR 6/29.

†**Mich., Garden City**—Pub. Bldgs. Admin 18 and F Sts. N.W., Wash., 25, D. C., 1 story 75x127 ft. recreation bldg., Mich. 30-31 FWA. CD 7/18—ENR 7/20.

Pa., California—C. M. Woolworth, secy Property & Supplies, general construction incl. mechanical alterations providing h firmary in North Dormitory, State Teacher College. Plans deposit $2.50

Pa., Pennhurst—Commonwealth of Penn sylvania, c/o C. M. Woolworth, secy., Prop erty & Supplies, horse barn, hay barn an corn cribs at Pennhurst State School. Plan deposit $2.50.

Bids Asked August 17

†**Ga., Hogansville**—Pub. Housing Auth. NHA, Georgia Savings Bank Bldg., Peach tree and Broad Sts., Atlanta, 32 trailer utilities, site imprvs., roads, walks, clear ing, grading, Ga. 9174. Plans deposit $1 Odis Clay Poundstone, Palmer Bldg., At lanta, archt. CD 7/19—ENR 7/27.

Bids Asked August 18

†**Md., Bethesda (br Wash., D. C.)**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave., N.W., Wash., 25, D.C., heating plant and laundry, addn., Naval Medical Research Center, NOY 3716. CD 4/26—ENR 5/4.

†**N. J., Winfield**—Federal Works Agency 101 Park Ave., New York, N. Y., 1 story frame school addn., N.J. 28-183. $28,800 Ziegler & Childs, 921 Bergen Ave., Jersey City, archts.

Bids Asked August 19

†**Va., Yorktown**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., addnl. bldgs., etc., Naval Mine Depot, Spec. 13811, NOY 3261. CD 4/1

†**Va., Yorktown**—Yards & Docks, Navy Dpt., 18 St. & Constitution Ave. N.W., Wash., 25, D. C. Torpex loading plant addn. at Naval Mine Depot, Spec. 13700, NOY 3137.

LIC BLDGS. (Bids Asked, Cont'd.)

Bids Asked August 29

Overland (St. Louis P. O.)—Rite-Consolidated School Dist., Bd. Educ., McAlister, pres., 8740 Forest Ave., St. Zone 14, 3 schools, Mo. 23-252. $1,000,000. FWA. Wm. B. Ittner, Inc., 406 Educ. Bldg., 911 Locust St., St. Louis, l engr.-archt. CD 8/12—ENR 8/18.

Bids Asked August 24

Wilhelmsburg—Yards & Docks, Navy 18 St. and Constitution Ave. N.W., 25, D. C., transit shed, storehouses ctns. to refrigerated storehouse, Naval Depot, Cheatham Annex, Spec. 14203, 1706.

Bids Asked About August 29

Calif., San Diego—Pub. Bldgs. Admin., and F Sts. N.W., Wash., 25, D. C., Elementary School, Calif. 4-584-1; Elementary School, Calif. 4-584-2; Elementary School, Calif. 4-584-3. A. P. L. Hope, Jr., 1008 San Diego Trust Bldg., archt. CD 8/5—ENR 8/8.

Bids Asked About September 15

Pa., Phila.—Dpt. Property & Supplies, Construction, Capitol Bldg., Harris-kitchen bldg. $500,000. H. A. Kuljian 1518 Walnut St., archts. CD 12/29—1/6.

Bids Asked September 19

Ark., North Little Rock — Veterans Vermont Ave., between H and I Sts. Wash., 25, D. C., addnl. bldgs., utili-CD 1/21—ENR 2/3.

Bids Asked

Pa., Johnstown—Rust Engineering Co., engr. and archt., Clark Bldg., Pittsburgh, 300x500 ft. brick, tile forging plant, Bethlehem Steel Co., W. C. Frank, eng. Johnstown. $10,000,000. Federally CD 7/17—ENR 7/20.

Va., Charlottesville — Superintendent & Grounds, University of Virginia, structure nurses home addn. Va. 44356. FWA. Taylor & Fisher, 1012 N. St., Baltimore, Md., archts. CD 4/28 6/6.

W BRIDGES

Ill., Alton—St. Joseph's Hospital, 915 E. St., July 31, nurses' home and training Ill. 11-253-N, from E. A. Brunson Co., 4053 Forest Park Blvd., St. Zone 1, $150,924. FWA. CD 6/24.

Mich., Wayne—Federal Works Agency, and Constitution Ave. N.W., Wash., 25, Aug. 1, school, Mich. 20-336, from Kutsche & Co., 2111 Woodward St., $167,500. CD 7/13—ENR 7/20.

Mo., St. Louis—Missouri Baptist Hospi-E. S. Pillsbury, pres., 919 North Ave., Zone 12, July 31, 4 story, bsmnt., 116x186 ft., L-shaped nurses' home hospi-addn., 4514 McMillan Ave., Mo. 23-306-N, John B. Gutmann Constr. Co., Wain-Bldg., 7 and Chestnut Sts., Zone 1, 000. FWA. CD 7/17—ENR 7/20.

Pa., Farrell—Pub. Housing Auth. NHA, 270 Bway., New York, 7, N. Y., July 31, unit 2 story, bsmnt., permanent family Pa. 20-1, from Haris Constr. Corp., Court St., Brooklyn, 2, N. Y., $764,510. 7/19—ENR 7/13.

CONTRACTS AWARDED

Calif., Burbank—Lockheed Aircraft Corp., Hollywood Way, 1 story, 150x250 ft., frame Bldg. 82A, etc., to Ford J. Twaits 461 S. Boylston St., Los Angeles, $185,-Bids 7/20. Defense Plant Corp. will Dance. D. B. Parkinson, 433 S. Spring St., Angeles, archt.

Calif., Oxnard—Pub. Housing Auth., NHA, 785 Market St., San Francisco, prefabricated portable dwelling units, 4661, to E. A. Kaiser Co., 8325 W. Blvd., Beverly Hills, $560,000. Bids CD 7/27—ENR 8/3, under LB.

Calif., San Bruno—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. W., Wash., 25, D. C., addnl. barracks, etc., Naval Advance Base Personnel Depot, 13982, NOY 9450, to Ford J. Twaits & Morrison-Knudsen Co., Russ Bldg., Francisco, $3,987,900 (incl. alt. addns. and 3). CD 7/21, under LB.

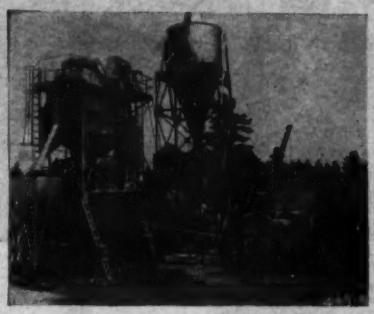
La., New Orleans—Pub. Housing Auth., NHA, 1205 Electric Bldg., Fort Worth, 150 unit family housing, La. 16106, to Farnsworth, 1515 S. Salcedo St., $774,-Bids 7/18. CD 7/15—ENR 7/20, under

Md., Baltimore—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., expanding Naval Magazine, Hawkins Point, NOY 9155, to Chas. H. Tompkins Co., 907 16 St. N.W., Wash., D. C., $536,-Bids 7/25. CD 7/15—ENR 7/27 under

Md., Greenbelt—Federal Works Agency, and F Sts. N.W., Wash., 25, D. C., school, 18-202-P3-1, to Nardis Const. Co., 403 Ave., Mount Vernon, N. Y., $152,449; school addn., Md. 18-202-P3-2, to E. L. Daniel, Arlington, Va., $89,147. Bids 7/14. 7/19—ENR 7/27, under LB.

Warren Paving Plants *Are Protected by Manganese Steel*

Noteworthy cases of time savings and "beating the promise" on paving jobs through the use of Mobile Asphalt Paving Plants have been frequent



during the "girding for war" period. A typical plant, designed and constructed by Warren Brothers Company, Cambridge, Mass., is shown in Photo 489-B. Plants of this type, which are readily moved from job to job and quickly set up for operation, have been used in over one hundred war paving projects.

Warren Mobile Asphalt Paving Plants are designed to complete the job with the greatest possible speed, at minimum cost and with maximum productive utilization of labor.

Such equipment must be built to operate continuously, with the least possible time lost for repairs and replacements. At the same time, the wearing parts are subjected to heavy loads, shocks and abrasive wear. Obviously, to use ordinary iron or steel parts would result in costly operating delays.

Continuous operation of these plants has been aided by the use of austenitic manganese steel for the wearing parts. Manganese steel trunnion rollers (Photo R-633) support the revolving drying cylinders or kilns. In the asphalt mixers, manganese steel split sprockets (B-1) and gears and pinions (B-1-A) are employed, and the mixer arms are likewise made of manganese steel. In these and other applications in Warren Equipment, the resistance to breakage and wear of "the toughest steel known" assures long life and uninterrupted production.

Ask for Bulletin 1143-CI, "Manganese Steel for the Construction Industry."

Send for Bulletin 941-W on Amsco Conservation Welding Rods.

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AMERICAN Brake Shoe COMPANY

40,000 sq. ft. floor in the Muskegon, Michigan Plant of Norge Machine Products Division, Borg-Warner Corporation. Contractor—Bitucrete Company, Detroit

INDUSTRIAL FLOOR

THE PROBLEM:
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—to get a crackproof floor—in spite of heavy loads—with a minimum of reinforcing steel
—to produce a concrete of minimum shrinkage—because of the extended area
—to prevent moisture rising from subgrade

THE SOLUTION: Plastiment, a Sika product, was successfully used to give
—dense concrete of high surface hardness
—high flexural strength
—reduction of water: cement ratio; retarded heat development
—moisture proofing because of uniform density with no cracks or weak spots
—at a cost on only 1¢/sq. ft. extra—without considering savings due to easier placing and elimination of separate surface treatment

Write for results of Government Tests Confirming these properties

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COMPLETE MACHINERY & EQUIPMENT CO. INC.
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BRANCH WAREHOUSE—Gary, Ind.

PUBLIC BLDGS. (Contracts Awarded Cont'd.)

Minn., New Ulm—City Public Utilities Comm., A. C. Sannwald, secy., furnishing, installing 6,000 kw. steam turbine generator in power plant, to Elliott Co., 216 Baker Bldg., Minneapolis, $152,425; condenser, to Worthington Pump & Machinery Corp., 140 University Ave., St. Paul. Bids 7/6.

★†**Minn., St. Paul**—U. S. Eng., 1709 Jackson St., Omaha, Neb., addnl. work at International Harvester Shell plant, (Twin Cities Ordnance Plant), to Standard-Anderson-Sterling Co., 604 Nail. Bldg., Minneapolis, $500,000.

★†**Neb., Mead**—U. S. Eng., 1709 Jackson St., Omaha, altering bldgs. and trackage, Contr. W-25-066-Eng-559, to Metcalfe Contr. Co., and Hamilton Constr. Co., Ry. Exchange Bldg., and Kansas City Bridge Co., Bridge Bldg., Kansas City, Mo., est. $87,000.

†**O., Carthage**—Richwood Steel Forge Co., 71 St., plant addn. to L. J. Briesmaier, 3461 Harrison Ave., Cincinnati, $73,461, Federally financed. A. M. Kinney, Inc., Enquirer Bldg., Cincinnati, archts.

†**O., Sharonville**—U. S. Eng., 522 U. S. Post Office & Courthouse, Cincinnati, 1 story, 96x208 ft. and 30x161 ft., concrete and masonry maintenance shop and storage, at Engineering Depot, to Penker & Associates, 1014 Summer St., Cincinnati, $106,190.

★†**Va., Norfolk**—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., addnl. storage facilities for ordnance materials, NOY 9046, to Virginia Engrg. Co., Melson Bldg., Newport News, $864,500. Bids 7/20. CD 7/26—ENR 8/3, under LB.

Ont., Parry Sound—Parry Sound General Hospital Bd., James St., J. O. McGowan, chn., Miller St., hospital bldg., to Chestnut-McGregor, Ltd., 96 Bloor St. W., Toronto. About $150,000. C. C. Woods, 412 Briar Hill Ave., Toronto, archt.

Que., St. Laurent (Postal Dist. Montreal)—Protestant Bd. School Trustees, c/o W. J. Lloyd, secy., 310 Gohier Ave., school, to Deakin & Stewart Ltd., 1440 W. Ste. Catherine St., Montreal. Est. $150,000. CD 6/14—ENR 6/22.

COMMERCIAL BUILDINGS

PROPOSED WORK

★**Calif., Upland**—Kaiser Co., Fontana and Pleasanton-Livermore Rds., Oakland, 500 dwellings. Est. over $500,000.

B. C., Vancouver—International Artists Films Corp., Ltd., 615 W. Hastings St., sim. production studios and theatre. $150,000.

N. S., Dartmouth—Dartmouth Hospital Assn., c/o Roy Boland, Dartmouth, general hospital. $150,000.

N. S., Sydney—Sydney Hospital Comm., Dr. M. MacAulay, chn., 100-bed hospital, $300,000.

Ont., Alfred—R. C. Parish of St. Victor, Alfred, church. $150,000.

Que., Montreal—Beinhaker Investment Corp., 5630 Park Ave., plans by M. M. Kalman, 4910 Victoria Ave., 3 story, basmt., 40x82x150 ft., brick apartment house, concrete fdn. $150,000. CD 7/13—ENR 7/27.

Que., New Richmond—Corp. de l'Hospital Bourg, Dr. A. St. Laurent, St. Charles de Caplan, plans by A. Dufresne, 143 Royal St., Beauport, 100 bed sanitarium, $250,000. E. Cormier, 2039 Manfield St., Montreal, engr.

BIDS ASKED

Bids Asked August 31

N. J., Union—Consolidated Const. Co., 149 Pomona Ave., Newark, 3 story, frame, brick garden apartment. McMurray & Schmidlin, 963 Stuyvesant Ave., archts.

CONTRACTS AWARDED

★**Ala., Montgomery**—Bradley Realty Sales Co., Hudson Bldg., one hundred eight 1 story, brick houses. Owner builds. $648,000. C. Pearson, 115 S. Union St., Montgomery, archts.

★**Calif., Van Nuys**—Biltco Corp., 2407 San Fernando Rd., Los Angeles, 207 frame, stucco dwellings, to Myers Bros., 2407 San Fernando Rd., Los Angeles, approx. $858,000.

★**Calif., Watts**—Bellivreau Co., 736 S. Palm Ave., Alhambra, 196 frame, stucco dwellings on 118 St., Place and Drive. Owner builds. Est. $764,000.

★**Calif., West Los Angeles**—Overland Housing Corp., 4700 Clark Ave., Lakewood Village, 640 dwellings, to P. W. Trueedale, 4700 Clark Ave., Lakewood Village, approx. $3,300,000. J. N. Douglas, 1041 E. Green St., Pasadena, archt.

Calif., West Los Angeles—Rodeo Corp., 1302 S. Bronson Ave., Los Angeles, eight 6 room frame, stucco dwellings. Owner builds. $400,000.

INDUSTRIAL BUILDINGS

...RCIAL BLDGS. (Contracts Awarded, ...t'd.)

...Wood River—Apex Realty Co., East ..., 10 houses, to Wolff Constr. Co., 913 ...Chestnut St., St. Louis, Mo., approx. ... FHA. Awarded 7/1.

...Greenville—Blatt Bros. Theatres (W. ... J. A. Blatt) 1701 Blvd. Allies, Pitts... 1 story, part bsmt., 120x120 ft., ... trust, concrete, brick, tile, etc. theatre, ... C. Hoppel, Patton. Est. $150,000. ... 7/25—ENR 6/26.

...Baie Comeau—Quebec North Shore ... Co., 680 Sherbrooke St. W., Montreal, ...structing La Salle Hotel, to Foundation ... of Canada, Ltd., 1536 Sherbrooke St. W., ...treal, $200,000. C. D. Goodman, 1502 St. ...rine St. W., Montreal, archt.

FACTORY WORK

...Calif., Anderson—MILL—Deschutes Lum... Co., c/o R. G. Watts, mgr., Anderson, ...ber mill, first units comprising mill power ... and shipping facilities, $500,000.

...Calif., Torrance—PLANT—Bow Chemi... Co., Torrance, replacement facilities ...styrene plant for ethyl-benene production, ...,000. Stone & Webster, Inc., 49 Fed... St., Boston, Mass., engrs.

...Calif., Visalia—PACKING PLANT—So... Walnut Growers Assn., Visalia, plans ... A. C. Martin, 333 Higgins Bldg., Los ..., 1 story, bsmt. walnut packing ..., over $40,000.

...Ind., South Bend—PLANT—Studebaker ...., Court Bend, making plans 2 story, ...t., brick, steel, rein.-con. engineering ..., for plant addn. $150,000. Giffels & ..., 1000 Marquette Bldg., Detroit, Mich., ... CD 6/21—ENR 6/8.

...Mass., Leominster—FACTORY—Wachu... Realty Co., Main St., soon lets contract, ...story, brick, factory addn. $40,000. S. W. ...yres & Associates, 336 Main St., Fitchburg, ...hits.

...Minn., St. Paul—PLANT, etc.—Skelly Oil ..., 4615 Humbolt Ave. N., Minneapolis, ...t incl. storage facilities for bulk pro... ..., oil canning plant, appliance retail ...ven offices, etc. University Ave. and Al... St. Over $150,000.

...Mont., Great Falls—DIESEL ENGINE ...—Great Northern Ry. Co., C. M. Nye, ... engr., 176 E. 4 St., St. Paul, Minn., plans ... T. D. McMahon, 175 E. 4 St., St. Paul, ...n., 50x200 ft. concrete, steel, Diesel en... shop, $200,000.

...N. H., Enfield—MILL—Columbian Carbon ..., Enfield, one 60-burner unit mill addn., ...el pipe and structural channels, etc. ...,000.

...N. M., Monument—PLANT—Chas. E. ... Johnson & Co., Monument, moving car... ...e black plant. $885,000.

...O., Archbold—FACTORY—King-Wyse Mfg. ..., Archbold, plans by Britsch & Munger, ...holas Bldg., Toledo, 100x200 ft. steel, ...asonry factory bldg. Over $40,000.

...O., Cleveland—FACTORY, etc.—National ...ating Co., W. Weil, pres., 6700 Grant ..., soon lets contract rebuilding factory ...d storage bldg. $150,000.

...O., Springfield—FACTORY—Ohio Steel ...undry Co., J. Galvin, pres., Lima, soon ...ts concrete 1 story, 60x100 ft., brick, steel ...tory addn., housing personnel, office and ...ther rooms.

...O., Toledo—FACTORY—Packard Motor ...r Co., 1580 E. Grand Blvd., Detroit, Mich., ...ans by Albert Kahn Associated Architects ... Engineers, Inc., engr.-archt., 345 New ...ster Bldg., Detroit, 2, Mich., two 1 and ... story, brick, rein.-con. factory addns. ...,717.

...S. C., Saluda—POWER PLANT, etc.—...uth Carolina Electric & Gas Co., Columbia, ...on lets contract, power plant addn., and ...lway bridge.

...Tex., McAllen—PLANT—McAllen Citrus ..., McAllen, citrus packing and canning ...t. $75,000.

...Utah, Salt Lake City—ROUNDHOUSE, ...—Denver & Rio Grande Western R. R. ... A. E. Perlman, ch. engr., Rio Grande ..., Denver, Colo., roundhouse exten., en... ...ite 28 stalls on 3 tracks, tank shop and hoist ...allations. $135,735.

...Va., Roanoke—FREIGHT TERMINAL—...bert J. Carson, archt., 325 Memorial Ave., ... Springfield, soon lets contract, brick, steel, ...ight terminal truck service for Associated ...ransport, Inc., c/o archt. CD 7/24—ENR ...21.

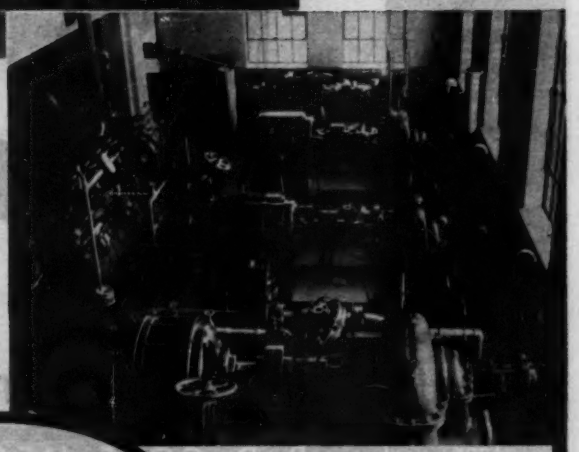
...W. Va., Bell—CHEMICAL PLANT—E. I. ... duPont de Nemours Co., duPont Bldg., ...mington, Del., chemical plant exten. and ...dial. facilities. $650,000.

...B. C., Prince George—PLANT—Western ...ywood Co. Ltd., Prince George, plant. ...,000.

LAST PRE-WAR WATER WORKS

Forecasts

POSTWAR DESIGN



7

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An ultra-modern addition to a plant completed in 1935, the recently completed Rocky Mount, N. C., water treating plant features 6 electrically-driven Morris double-suction centrifugal pumps that deliver 6,750,000 gallons daily, and a gasoline-driven emergency Morris pump capable of pumping 3,500 gallons per minute against a 160 foot total dynamic head.

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3. Quietness of operation.
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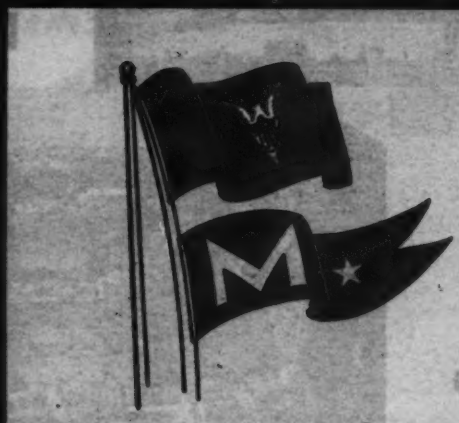

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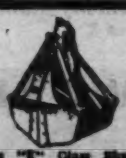

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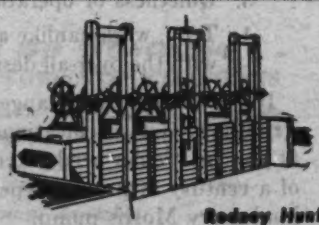
THE HAYWARD CO., 46-56 Church St., N. Y.



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INDUSTRIAL BLDGS. (Proposed Work. Cont'd.)

B. C., New Westminster—PLANT—Gyp... Lime & Alabastine, Canada, Ltd., New W... minster, gypsum plaster and wallbo... plant. $100,000.

B. C., Vancouver—STORAGE—Wing ... Co., Ltd., c/o 241 Keefer St., plans Gardiner & Thornton, 718 Granville ... 2 story, full bsmmt., 124x165 ft., rein.-c... storage and distr. bldg. $125,000.

Man., Giroux — GRAIN ELEVATOR ... Manitoba Pool Elevators Ltd., Giroux, gr... elevator. $40,000.

Nova Scotia — FACTORY — Buick ... Mills, Ltd., Depot St., Cowansville, Q... factory. $45,000.

N. S., Windsor Junction—PLANT—Sta... ard Woodworks, Ltd., Windsor Jct., pl... addn. $40,000.

Ont., Galt—PLANT—Newland & Co., L... Galt, modernizing plant, 3 story, 62x100 ... brick, timber addn. $40,000.

Ont., Hamilton—PLANT—White Canad... Aircraft Ltd., 7 N. Wellington St., pl... addn. $40,000.

Ont., Hamilton—SERVICE STATION, ... —Supertest Petroleum Corp., Ltd., 7 E. R... lington St., service station, etc. $40,000.

Ont., Kitchener—PLANT—Kitchener Fac... ers Ltd., Kitchener, plant addn. $50,000.

Ont., Owen Sound—PLANT—Empire Ste... & Furnace Co. Ltd., 3342 3 Ave., rebuild... plant. $75,000.

Ont., Sault Ste Marie—PLANT—Wind... Metallurgical Process Ltd., Sault Ste Mar... plant. $50,000.

Ont., Toronto—GARAGE—T. J. Pergus... engr., 297 Victoria St., soon lets contra... garage and office bldg., for Victory Mills, L... 25 Richmond St. W. $45,000.

Ont., Toronto—PLANT—Canadian Tamp... Corp., Ltd., 533 College Ave., plans by Jam... & Delameter, 621 Spadina Ave., 1 sto... 75 x 200 ft., steel, glass, rein.-con. pla... $65,000.

Ont., Toronto—PLANT—Fyron Ceram... Ltd., c/o G. Ruel, 51 W. King St., pla... $50,000.

Ont., Toronto — PLANT — Manton Bro... Ltd., 105 Elizabeth St., plant addn. $40,0...

Ont., Toronto—PLANT, etc. — McVitt... Graham Mining Co., c/o A. M. Mortime... 67 Yonge St., imprv. and operating miner... lands and deposits, plant for raising, crus... ing, washing, etc. $75,000.

Ont., Toronto—PLANT, etc.—Port Radi... Mines, Ltd., c/o L. M. Keachie, 214 ... Adelaide St., mineral land and deposit de... velopment, plant for raising, crushing a... washing. $75,000.

Ont., Toronto—PLANT—Reardon Tool ... Supply Co., Ltd., c/o N. McFarlane, 372 B... St., plant for manufacturing and repairi... machinery, machine tools, metal product... etc. $45,000.

Ont., Toronto—WAREHOUSE, etc.—Atl... Steels, Ltd., 417 Main St. E., Welland an... 401 Front St. W., Toronto. exten. warehou... and office bldg. $60,000.

Ont., Tweed—PLANT—Jos. Rashotte C... Ltd., c/o A. Bernard Collins, K. C., Bel... ville, woodworking plant. $40,000.

Que., Arvida—PLANT—H. Blais Co., P. O... Box 575, printery-lithographic plant. $40,000.

Que., Dolbeau—DEHYDRATING PLAN... —Agricultural Co-operative Society, c/o G... N. Fortin, Normandin, fruit dehydrati... plant, $40,000. A. Belzile, Normandin, eng...

Que., Dorval—PLANT—West Aeronautic... Devices Incorp., 1079 Mountain St., Montreal... plans by L. Perry, 1502 St. Catherine St... W., Montreal, 1 story 75x100 ft. plant wit... 2 story, 30x50 ft. office bldg., Cote des Lie... Rd. near Dorval Airport. $75,000.

Que., Montreal—FACTORY—Cadieux Ele... trical Appliances Co., 8269 Droiet St., ... story, 53 x 139 ft., brick factory. $40,000.

Que., Montreal—FACTORY—Vita Mills ... Chemical, Ltd., c/o C. Casey, 275 St. Jam... St., factory. $40,000.

Que., Nominique — FACTORY—Belleriv... Veneer & Plywood Co., Nominique, factory... $40,000.

★ **Que., St. Laurent (Postal Dist. Montreal)** —Industrial Glass Works Co. Ltd., ... Ouimet Ave., glass mfg. plant. $1,500,0... (Correction—estimated cost). CD 6/20—EN... 6/22.

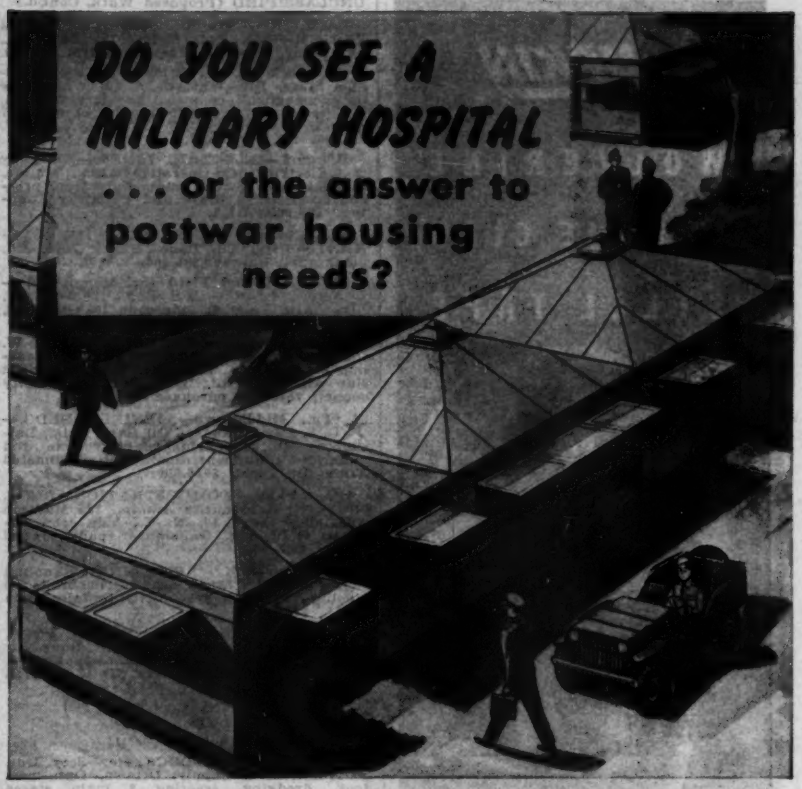
Que., Sherbrooke—PLANT—Hovey Pack... ing Co., 19 Lansdowne St., remodeling plant... $50,000.

BIDS ASKED

Bids Asked August 15

Mass., Walpole—PLANT—F. Burton Mitch... ell, archt., Box 147, Foxboro, brick, ste... plant addn., altering existing bldgs., Mai... St., for Ranger Corp., 2000 Main St. Plans de... posit $10 each set.

S. C., Lexington—POWER PLANT—Sou... Carolina Electric & Gas Co., Columbia, ... power plant addn. and spillway bridg... Saluda Dam. (Correction-location.) C... 8/1—ENR 8/3 under Saluda.



ACTUALLY you see both. For prefabricated Dallas Huts are multi-purpose structures.

This illustrated, three-unit combination currently provides efficient field-hospital quarters. Tomorrow, when its military purpose has been fulfilled, this very same building (because it's quickly demountable, 100% salvageable, and remarkably portable) can supply rehabilitation housing for a war-torn populace. And postwar America may find its counterpart serving a multitude of peacetime needs.

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Yes, Dallas Huts offer unusually flexible housing. Single units satisfy a variety of purposes. Yet units can be combined into any desired multiples or arrangements, to fit the most exciting requirements.

Pre-Fabricated housing is here to stay! And the Dallas Hut (or Texas Pre-Fab) provides unique practicability for quick postwar housing.

Today, the Texas PRE-FAB is growing by leaps and bounds, and offers attractive POST-WAR possibilities. Already many applications for current and post-war dealerships are being received—from both civilians and military men. If you visualize the tremendous potentialities for Texas Pre-Fabricated Housing, and would like a profitable part in the future of this rapidly expanding industry, sign and mail the coupon below.

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TEXAS PRE-FABRICATED HOUSING COMPANY (Distribution Division)
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Gentlemen:

I'm definitely interested in the future of this industry, and would like more information regarding a possible dealership arrangement for post-war.

Name_____ Capacity_____

Current Address_____

Home Address_____
(if different from above)

City_____ State_____

Further Remarks_____

Bids Asked

...R. Memphis—PLANT—Can. Liquid Air Ltd., 1111 Beaver Hall Hill, Montreal, ... brick, reinf.-con. oxygen plant, $50,000.

...RUCTS AWARDED

...Burbank—PLANT—Lockheed Aircraft Corp., 2555 Hollywood Way, Burbank, ...T, L-shaped office and factory bldg. No. ... from H. M. Keller Co., 4604 Hollywood ... to Los Angeles, $71,450. D. B. Parkinson, ... S. Spring St., Los Angeles, archt.

Tex., Houston—PLANT—Shell Oil Co., Inc., Chemical Div., Shell Bldg., chemi... paint, from C. F. Braun & Co., Esperson ... Houston, approx. $700,000. CD 7/31 ... 1/1.

...Sibley—PLANT, etc.—Osceola County ... Creamery Assn., Sibley, 1 and 2 ... 48x172 ft. dehydrating plant, 1 and 2 ... part bsmnt., 39x154 ft. creamery ... to C. H. Peterson Co., 630 National ... Minneapolis, Minn. Bids 7/18. CD ...—ENR 7/13.

...Aitkin — PLANT — Land o'Lakes ...merica, Inc., 2202 Kennedy St. N. E., ...neapolis, general contract 1 story, 42x92 ... poultry dressing plant and hatchery, rein.-... face brick, to J. Fossum, Aitkin, $43,000.

...Greenville—RAILROAD STATION ...Illinois Central R. R., C. H. Mottier, ch. ... 135 S. 11 Pl., Chicago, 5, Ill., railroad ..., to Virden Lumber Co., Greenville, ...

...J., Hackensack—FACTORY—Hacken... Cable Corp., 165 Zabriskie St., altering ...story, factory and bag platform to F. ...ert, 224 R. R. Ave., $49,120. C. Bogert, ... Main St., archt.

...O., Carthage—DISTILLERY—Natl. Distillers Products Corp., 7218 Anthony Wayne ..., design and construction distillery bldg. ... to Sanderson & Porter, 52 William St., ...w York 5, N. Y. Est. $100,000.

...O., Chillicothe — PLANT — National Fireworks Inc., Chillicothe, 18 addnl. plant ...dgs., to H. M. Boyajohn, 993 W. Third ..., Columbus, approx. $400,000.

Tex., Amarillo — REFINERY—Consumers Co-Operative Assn., Amarillo, imprv. refinery ...ant force account, $40,000. CD 3/24—ENR ...

Tex., Houston—PLANT—Reed Roller Bit ..., Mack St., concrete, brick, hollow tile, ...ructural and reinforced steel, etc. munition ...ant, to Southwestern Constr. Co., 2502 Calhoun Rd., approx. $500,000.

Tex., Houston—PLANT—Sheffield Steel ..., Industrial Rd., steel, rein.-con. slag ...shing plant, to A. G. McKee Co., Commerce Bldg., $100,000. CD 11/18—ENR 11/25.

Ont., Hespeler—PLANT—Artex Woolens, ...d. 239 W. Adelaide St., Toronto, remodeling plant, day labor. $40,000.

Ont., Ottawa—PLANT—Morrison & Lapthe Bakery, Ltd., 95 Echo Dr., plant ..., to Ross-Meagher, Ltd., 7 Echo Dr., ...ost $77,537. Bids 7/10. CD 6/30—ENR 7/6.

Que., Montreal — FACTORY — Ma Belle ...ps Co., S. N. Tabah, proprietor, 372 St. ...atherine St. W., 2 story bsmnt. factory, ...rwise and Jean Talon St. W., to L. ...nsolo, 25 Jean St. W., about $50,000.

Que., Montreal—FACTORY—S. N. Tabah, ...t Ste. Catherine St. W., 2 story, bsmnt., ...ick factory, concrete fdn., to L. Donolo, ... Jean Talon St. Est. $50,000. CD 7/20—... 7/27.

Que., Montreal—FREIGHT SHED—Canada Steamship Lines, Ltd., 715 Victoria ..., Shipping Shed 2, bldg. 1 and 2 story, ...0 x 775 ft., steel frame, etc., to L. G. ...quirie & Co. Ltd., 2228 Walkley Ave., ...ost $500,000. CD 6/28—ENR 7/13.

Que., Ste. Anne De Bellevue—PLANT—...rbourvale City Press, Ste. Anne De Bellevue, printing plant exten., to A. F. Byers ...ss Co. Ltd., 1226 University Ave., Montreal. Est. about $90,000. CD 4/5—ENR ...

Que., Ste. Therese — PLANT — Commonwealth Plywood Co. Ltd., Ste. Therese, ...-con. tank and tunnels, etc. for log ...aming at existing plant, to A. F. Byers ...ss Co., Ltd., 1226 University Ave., Montreal, $65,000.

UNCLASSIFIED

PROPOSED WORK

Calif., Long Beach—TRACK EXTENSION ...The Atchison, Topeka & Santa Fe Ry. Sys., ... C. Blanchard, ch. engr. (Coast Lines), ...0 E. Main St., Los Angeles, approx. 2 mi. ...rack exten. into Long Beach Harbor area. Over $25,000.

Ohio, Jaisburg—SEMAPHORE SIGNAL ...HEAD REPLACEMENT, etc.—Union Pacific ...R. R. H. Prater, ch. engr., 1416 Dodge ..., Omaha, 2, Neb., altering existing installations and replacing 174 semaphore signal heads and mechanism, with color light heads, $33,842.

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CHROME CLAD

STEEL TAPE

The Lufkin Chrome Clad "Wolverine" Steel Tape is a favorite with engineers. Its durable markings — jet black against a satin chrome surface are extremely easy to read. The strong, sturdy line effectively resists rust, is easily kept clean. The metal disk reel is light-weight and rust proof. The Tape Ring locks under a spring on the reel, guarding against first end breakage. The one piece winding handle gives extra leverage and when turned over, locks the tape at any point.

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UNCLASSIFIED (Proposed Work, Cont'd.)

Conn., New Haven — POLICE ALARM SYSTEM—City, Dpt. Police, 165 Court St., expanding, imprv. police alarm sys. $55,000.

Ill., Rock Island—PARKING AREA—Illinois State, Div. Waterways, 201 W. Monroe St., Springfield, constructing parking area, Mississippi River Front imprvt. between 17 and 18 Sts. $50,000. T. B. Casey, 201 W. Monroe St., Springfield, ch. engr.

Missouri — ELECTRIC LINES — Callaway Co. Electrical Co-Operative Assn., Fulton, 65.8 mi. new electric lines, and exten. present facilities, Audrain and Callaway Counties. $90,000. REA.

N. J., Newark—PLAYGROUND IMPROVEMENTS—City, Bd. Educ. Bldg., Green St., playground imprvs. $25,000.

†**N. Y., Mitchel Field (br. Hempstead)**—LEAN-TO BLDG.—U. S. Eng., 120 Wall St., New York, Zone 5, bids soon lean-to bldg. $41,000.

N. C., Charlotte—CEMETERY—City, R. W. Flack, city mgr., plans construction, clearing, grading, etc., municipal cemetery, right side Albemarle Rd., 1 mi. from here. City council voted to purchase tract.

★†**Pa., Middletown**—AIRFIELD BLDG.—U. S. Eng., Standard Oil Bank Bldg., Baltimore, Md., preparing plans vehicle and motorized equipment repair shop at Olmsted Army Air Field. $850,000.

†**Pa., Phila.**—ADMINISTRATION BLDG, etc.—Civil Aeronautics Admin., 225 Madison Ave., New York 17, N. Y., bids soon administration bldg., transmitter roads, control tower. $200,000.

Wyoming—OIL PIPELINE—Stanolind Pipe Line Co., Casper, 6 and 8 in. crude oil pipeline gathering sys., Little Buffalo Basin Pool. $134,155.

Que., Three Rivers—SWIMMING POOL, etc.—Municipality, c/o Mayor A. Rousseau, swimming pool, playgrounds, etc. $30,000. I. Asselin, City Hall, engr. CD 12/9—ENR 12/16.

BIDS ASKED

Bids Asked August 14

★**B. C., Vancouver**—DOCK, etc.—Secy. Dpt. Munitions & Supply, Ottawa, Ont., new dock, dredging, erecting 3 main stores bldgs., administration bldg., ordnance and engineering bldg., inflammable stores structure, boiler house, garage and guard house, at North Vancouver, near Lynn Creek, for Dpt. Natl. Defense (Sea). $2,500,000. CD 4/25—ENR 5/4.

Bids Asked August 15

N. S., New Glasgow—AERODROME—Secy. Dpt. Transport, Ottawa, Ont., addnl. aerodrome development, incl. mainly clearing, grading and constructing road diversion. $35,000. Plans deposit $10.

Bids Asked August 16

N. Y., Deer Park—RAILROAD TRACK, etc.—Dpt. Mental Hygiene, Albany, railroad track and trestle. $34,000. Plans deposit $5. Comr. Architecture, C. J. White, Albany, engr.

†**N. Y., Massena** — GRADING — Federal Works Agency, 101 Park Ave., New York, 17, grading, top soil, seeding, etc. at Memorial Hospital Grounds.

Bids Asked August 18

†**Md., Cumberland** — AIRPORT — Dpt. P. Wks., City Hall, airport construction incl. 900,000 cu. yd. excav., 18,500 lin. ft. drainage, 3,350 sq. yd. concrete paving, 107,600 sq. yd. bituminous paving, etc., at Municipal Airport. $150,000. Plans deposit $10. $150,000. CAA.

Bids Asked August 24

N. Y., Brooklyn—PIER SHEET METAL SIDING—At office Executive Director The Port of New York Auth., 111 Eighth Ave., New York, 11, replacing sheet metal siding in walls of pier shed of Columbia Street Pier at Port Authority Train Terminal, foot of Columbia St., Gowanus Bay, Contr. GT-2. Plans deposit $10; adv. ENR 8/10.

Bids Asked

★†**Calif., San Francisco**—PIER—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., constructing Pier 2, etc., at Bethlehem Steel Co., NOY 1536 (amend.). $2,300,000.

LOW BIDDERS

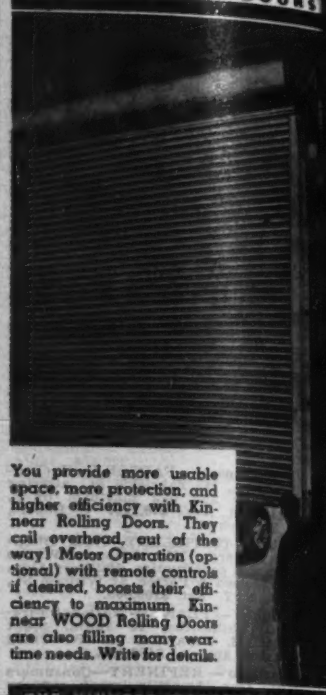
★†**Ga., Glynco**—RUNWAYS, etc.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., grading, asphalt paving and concrete aprons for runways, taxiways, etc., from H. E. Wolfe Constr. Co., St. Augustine, about $1,080,000. CD 7/13.

†**Ga., St. Mary's**—AIRPORT SPILLWAYS, etc.—Civil Aeronautics Admin., Municipal Bldg., Atlanta, airport facilities, incl. spillways, filling all washes, reseeding portions condition area and clearing approach zones, from H. G. Smith, Fitzgerald. $48,585.

Saving Ways in Doorway

KINNEAR

ROLLING DOORS



You provide more usable space, more protection, and higher efficiency with Kinnear Rolling Doors. They coil overhead, out of the way! Motor Operation (optional) with remote controls if desired, boosts their efficiency to maximum. Kinnear WOOD Rolling Doors are also filling many wartime needs. Write for details.

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WASHINGTON, D. C.

CONTRACTS AWARDED

Calif., Alameda—AIR STATION SHOP—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., one overhaul shop, Naval Air Station, NOY 5071, to Stolte, Inc., 8451 San Leandro Blvd., Oakland, $645,400. CD 7/18, under LB.

Calif., Alameda—AIR STATION—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., D. C., completing Naval Air Station, NOY 4165 and 5966, to Dinwiddie Drake & Piper, Inc., 1736 Franklin St., Oakland. $223,900.

Calif., El Toro—AIR STATION BLDGS.—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., miscellaneous bldgs., Naval Air Station, NOY [illegible] to Rob. E. McKee, 7400 San Fernando Rd., W., Los Angeles, Zone 26, $1,500,000. 7/31, under LB.

Calif., Maywood—AIRFIELD STORAGE SPACE—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, addnl. storage space, Army Airfield Supply Depot, Contr. W-04-353-Eng-780, to A. H. Koebig, Jr., 2494 S. Main, Los Angeles, $38,138.

Calif., Muroc—AIRFIELD OFFICERS' QUARTERS—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, officers' quarters, Army Airfield, Contr. W-04-353-Eng-792, to H. Stratton, Pasadena, $118,655.

Calif., San Luis Obispo—SWIMMING POOL—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, swimming pool addns., Contr. W-04-353-Eng-784, to W. J. Hunter, 1 Heliotrope Dr., Los Angeles, $35,549.

Calif., Santa Maria—AIRFIELD HOUSING—U. S. Eng., 751 S. Figueroa St., Los Angeles, Zone 14, housing Army Airfield, Contr. W-04-353-Eng-783, to W. J. Hunter, 1 Heliotrope Dr., Los Angeles, $88,000.

Calif., Van Nuys—HANGARS, etc.—U. S. Eng., 751 S. Figueroa St., Los Angeles, hangars, miscellaneous bldgs., paving, utilities, Metropolitan Airport, Contr. W-04-353-Eng-800, to Weymouth-Crowell Co., 2104 E. 15 St., Los Angeles, $389,058.

Kan., Fort Benning—LANDING STRIP—U. S. Eng., Grant St. west of Westwood Blvd., Mobile, Ala., airplane landing strip, to Foley Bros. Constr. Co., Eastman, $105,776.

Kan., Hutchinson—AIR STATION WORK—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash., 25, D. C., addnl. work Naval Air Station, to Kaltenbach-Stuller Constr. Co., 1150 Griswold St., Detroit, 26, Mich., $707,400.

Ky., Godman Field (br. Fort Knox)—AIRFIELD FACILITIES—U. S. Eng., 612 Federal Bldg., Louisville, constructing addnl. facilities, Contr. W-15-029-Eng-457, to General Constr. Co., 1530 S. 6 St., Louisville, $[illegible]

Ky., Louisville—RAILROAD SPUR, etc.—U. S. Eng., 612 Federal Bldg., Louisville, railroad spur, etc., Nichols General Hospital, Contr. W-15-029-Eng-665, to Henry Bickel Co., 1930 E. Chestnut St., $29,795.

Md., Carderock—MODEL BASIN—Yards & Docks, Navy Dpt., 18 St. and Constitution Ave. N.W., Wash. 25, D. C., exten. model basin at Naval Experimental Basin, Spec. 1d. NOY 10335, to Turner Constr. Co., 11 Broadway, New York 17, N. Y.

Mo., Malden—HANGARS, etc.—U. S. Eng., 1613 E. 17 St., Kansas City, prefabricated hangar, etc., Contr. W-23-038-Eng-508, to George L. Cousins Contracting Co., 875 N. Walker Blvd., St. Louis, $113,000.

Neb., McCook—APRON PAVING—U. S. Eng., 1709 Jackson St., Omaha, concrete apron paving, to Anderson Bros. & Co., 100 E. 9 St., Minneapolis, Minn. $49,813.

N. C., Bowling Green—HANGAR, etc.—Bowling Green State University, Bowling Green, hangar and storage bldg., at Bricker Airport, to Steinle Wolfe Co., Inc., 1515 Croghan St., Fremont, $54,304. Est. $60,000. T. E. Ingalls, Columbus, state archt. Bids 6/22. CD 7/1—ENR 7/13.

Pa., Phila.—TAXIWAYS—U. S. Eng., 6 E. Walnut Sts., taxiways, addnl. drainage, grader grading, etc., asphalt paving, Northeast Airport, to General Asphalt Paving Co., Glen View and Rising Sun Aves., $[illegible] Bids 8/1, awarded 8/2. CD 7/27.

P. C., Comox—TRANSMITTER SITE CLEARING—Dpt. Transport, Ottawa, Ont., clearing wireless transmitter site, to Maxwell Const. Co. Ltd., 540 Howe St., Vancouver, about $35,000.

Ontario—RUNWAYS—Dpt. Natl. Defense for Air, Ottawa, repairing and surface treating runways at No. 18, S.F.T. School, to Preston Bros., 37 Market St., Brantford, $[illegible]

Proposal Advertisements see p. 227
Postwar Projects see p. 194

Processing PENICILLIN *and* BLOOD PLASMA *with the aid of Deming Pumps*

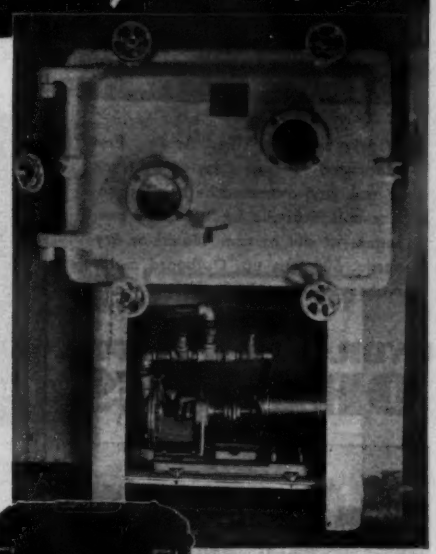

Photo at right shows one of the autoclaves, or drying ovens, used in processing *penicillin* and also *blood plasma* in two separate plants of the Ben Venue Laboratories, Inc., at Bedford, Ohio.

Bottles of the frozen penicillin are placed in the drying oven and the Deming Pump circulates cold alcohol until all moisture is condensed. Then the pump circulates hot alcohol until the rapid evaporation dehydrates the penicillin.

A similar method is used in the dehydration of blood plasma, excepting that water is used instead of alcohol.

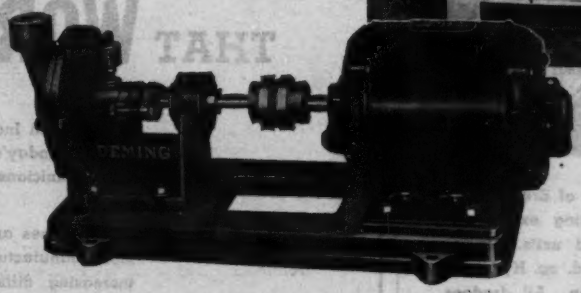

Photo at left shows a Figure 3910 Deming Side Suction Centrifugal Pump used in each autoclave for dehydrating penicillin and blood plasma.

Deming Pumps play an important part in the processing of the "wonder drug" *penicillin* and equally vital blood plasma at Ben Venue Laboratories, Inc., at Bedford, Ohio.

In the process of dehydrating both penicillin and blood plasma, preparatory to packaging, the materials are placed in autoclaves or drying ovens, each unit equipped with a Figure 3910 Deming Side Suction Centrifugal Pump.

Another type of Deming Pump—a Figure 4700 Deep Well Turbine—is used at Ben Venue Laboratories for water supply. This pump reduces water costs approximately 33⅓% under the municipal rates on the volume of water obtained from the well.

When YOU have a pumping problem—either in connection with using pumps as component parts of other equipment—or as separate units—or for water supply, Deming and the Deming Distributor in your vicinity will help you to the correct applications of Deming Pumps. Write THE DEMING COMPANY, SALEM, OHIO.

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